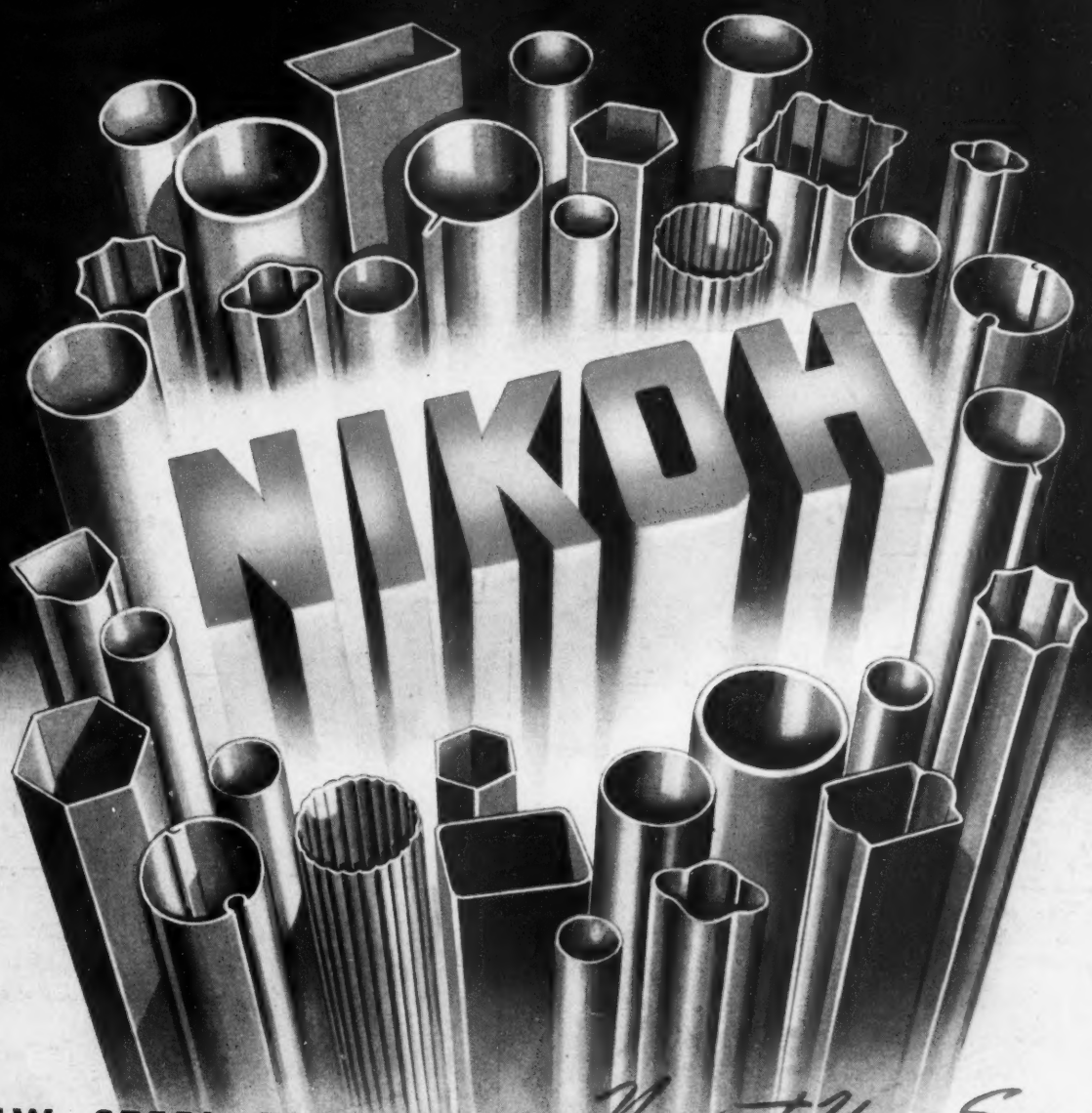
April 26, 1948

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 63



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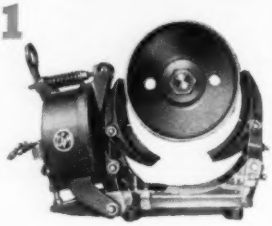

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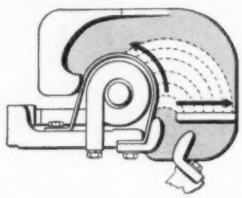

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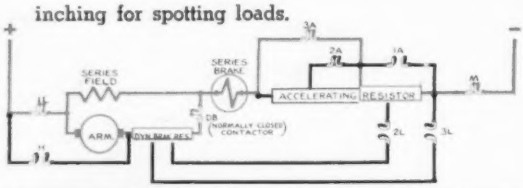

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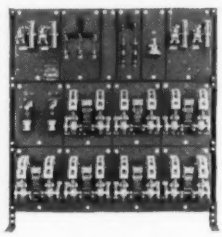

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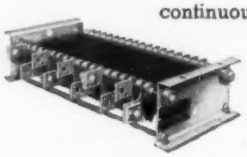

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Pressure Molding Provides Structurally Sound Cast Parts

The Spectrograph as an Aid In Quality Control

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 122, NO. 17 APRIL 26, 1948

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Experiment in Italy

Participation by the United States in the Italian elections marks a departure from this nation's foreign policy. We openly and deliberately meddled in the balloting of Italian citizens for members of their law making bodies. We used official diplomatic pressure to aid the forces of democracy. Many of our citizens, acting individually, appealed to friends in Italy to vote against the Communist-Popular Front.

The result was gratifying from our standpoint. Premier de Gasperi's Christian Democrats won 48.7 per cent of the seats in the Chamber of Deputies and 47.9 per cent in the Senate. Giuseppe Saragat's anti-Communist Socialist Party won 7.1 per cent of the seats in the Chamber and 7 per cent in the Senate. Together the two parties have a clear majority, which means that with reasonable luck Premier de Gasperi can swing a majority on most issues without having to rely on deals with the various splinter parties.

This victory runs true to a formula that has stood the test of time for 30 years. It is that without the direct aid or influence of the Red Army, the Communists cannot win and hold control of an independent nation by boring from within.

With the initial victory won the United States now can proceed with the application of the European Recovery Program to Italy's problems. In this connection, it will be interesting to observe the extent to which the establishment of a government that is stable politically will make it easier for the nation to achieve economic stability. It would seem that if Premier de Gasperi, with a working majority in both houses, can introduce reforms that will improve the social and economic status of Italy's millions, the need for formal financial assistance from outside will be lessened appreciably.

This possibility is important to the United States. It may alter our thinking as to how assistance under ERP can be made most effective. It may mean that a much larger proportion of ERP aid than originally estimated should go into pump-priming and a smaller proportion into relief.

The Italian experiment is off to a good start. If we can follow up our initial advantage intelligently, we may reduce ERP to a smaller burden than was anticipated.

* * *

ON TO PHILADELPHIA: Next week at Philadelphia thousands of foundrymen will attend the 52nd annual convention of the American Foundrymen's Association and the exhibition of foundry equipment and supplies. Everybody is expecting an unusually fine program.

In several respects the 1948 event at Philadelphia will differ from the first postwar convention and show in Cleveland in 1946 and from other previous affairs. One reason for this is that many of the papers and much of the discussion in the technical sessions will reflect the extraordinary conditions under which the foundry industry has been operating since V-J Day. For more than two and one-half years foundrymen have been combatting shortages of metallics, lower quality of certain materials and numerous other unusual problems. Expedients developed to overcome these handicaps have been introduced into current foundry practice and will be discussed at Philadelphia.

An unusual number of noteworthy improvements in the equipment and supplies displayed by the 260 exhibitors at the show may be ex-

(OVER)

pected. One reason for this is the fact that enough time has elapsed since the end of the war to permit builders and manufacturers to develop their postwar lines. Two years ago at the Cleveland show exhibitors had had only a few months in which to shift their attention from wartime production to postwar models. The 1948 show may easily establish a new record in the number of brand new offerings of equipment and supplies. —p. 114

* * *

BARGAIN FOR SECURITY: Although present contracts between steel companies and the United Steelworkers of America-CIO specifically limit current negotiations to "general and uniform changes in rates of pay," it is known that a comprehensive program of social security benefits for steelworkers and their families has been a major topic of discussion by representatives of employers and the unions. It is reported that union spokesmen are demanding a program that would embrace life insurance and sickness and accident benefits, including hospitalization.

In view of contract limitations, action on social insurance probably will be postponed for some time. However, the success of the coal miners in winning pensions and the pressure from other union groups for security provisions point to the likelihood that before long social insurance will be as common a subject for collective bargaining as hours and wages have been. —p. 74

* * *

DECEPTIVE PROFITS: So much emphasis has been placed upon the alleged high profits of steel companies in 1947 that it may be well to look at the composite figures for 27 leading producers to see just what is what.

These 27 steelmakers, representing about 91 per cent of the nation's ingot capacity, had an aggregate net income after taxes of $397,355,070 in 1947. This constitutes a 59 per cent increase over the net of $249,009,351 in 1946. In 1947 the companies operated at an average of 93.47 per cent of ingot capacity, whereas in strike-ridden 1946 the average was only 75.29 per cent of capacity. Obviously, this substantially higher operating rate in 1947 helped make all orthodox profit comparisons for that year look pretty good.

However, every steelmaker is conscious of hidden factors, such as high cost of equipment replacement, which tend to make conventionally-figured profits fictitious. For instance, a little simple arithmetic on composite balance sheet figures will show that the aggregate net working capital of the 27 companies, which was $1,782,671,264 in 1946, dropped to $1,673,334,583 in the supposedly good year of 1947. In 1946, working capital was 39.3 per cent of net sales; in 1947 it was only 26.1 per cent of sales.

Considering the terrifically high break-even point in the industry today, coupled with the unsolved problems that lie ahead, one is fully justified in looking at current profit margins with a suspicious eye. —Following p. 78

* * *

ACT NOW, TALK LATER: At long last somebody has proposed that some official red tape be cut in order that the United States can speed the delivery of ferrous scrap from Germany. According to Washington information, the latest idea is to by-pass, for the moment, the Marshall Plan provision that scrap in Germany is to go to the participating European nations and to the United States. Government officials fear that an indefinite delay would result if time were taken now to consult all parties involved before taking action. Therefore the present intention is to go ahead immediately on the basis of shipping from 500,000 to 1,000,000 tons of scrap at the earliest possible moment and to negotiate about it later when circumstances permit.

This may appear to be an arbitrary method, but it is about the only way this nation can hope to get action on the scrap in Germany. There has been far too much time-consuming talk and too little action. —p. 76

* * *

ROLE OF LUBRICATION: Each succeeding annual convention of the youthful American Society of Lubrication Engineers serves to emphasize anew the important role efficient lubricating methods and equipment play in the successful operation of modern machinery. This was particularly true of the third annual convention and exhibition held last week in Buffalo. There the several hundred visiting engineers saw and heard abundant evidence that the technique of lubrication is more than keeping pace with progress in other aspects of the design and construction of machinery. —pp. 78, 108

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

STEEL PRICES CUT—Prices on a wide variety of steel products will be reduced May 1 by U. S. Steel in the first general steel price reduction since before the war (p. 74). Reductions will amount to about $25 million annually on U. S. Steel's sales and will be applicable primarily to those products which affect the cost of living. Other producers were taken by surprise by U. S. Steel's announcement, had not decided on a course of action late last week.

WAGE INCREASE REFUSED—In a second move to combat inflation U. S. Steel has refused (p. 74) the demand by the United Steelworkers for a "substantial wage increase." This apparently ends the matter of steel wage negotiations for this year as the contract between the union and U. S. Steel provides that wage adjustments are the only matter that can be considered at this time; the contract continues as is until Apr. 30, 1949. The steelworkers have announced they will abide by their no-strike contract. Prior to the breakup of the wage negotiations, the union had asked the corporation for a broad social insurance program. Possibly some concessions toward this program may be granted.

STEEL SUPPLY—This week the loss of steel production as a direct result of the coal strike will pass the 1.5-million ton mark. This loss, coupled with increased requirements for foreign aid, military preparation and essential domestic programs (p. 71), blasts the hopes of steel producers and users that a balance between supply and demand could be achieved this year. Metalworking companies are beginning to feel the impact of decreased steel shipments. Some have closed; others have curtailed operations. The effects of the coal strike will be felt by steel users for many weeks to come.

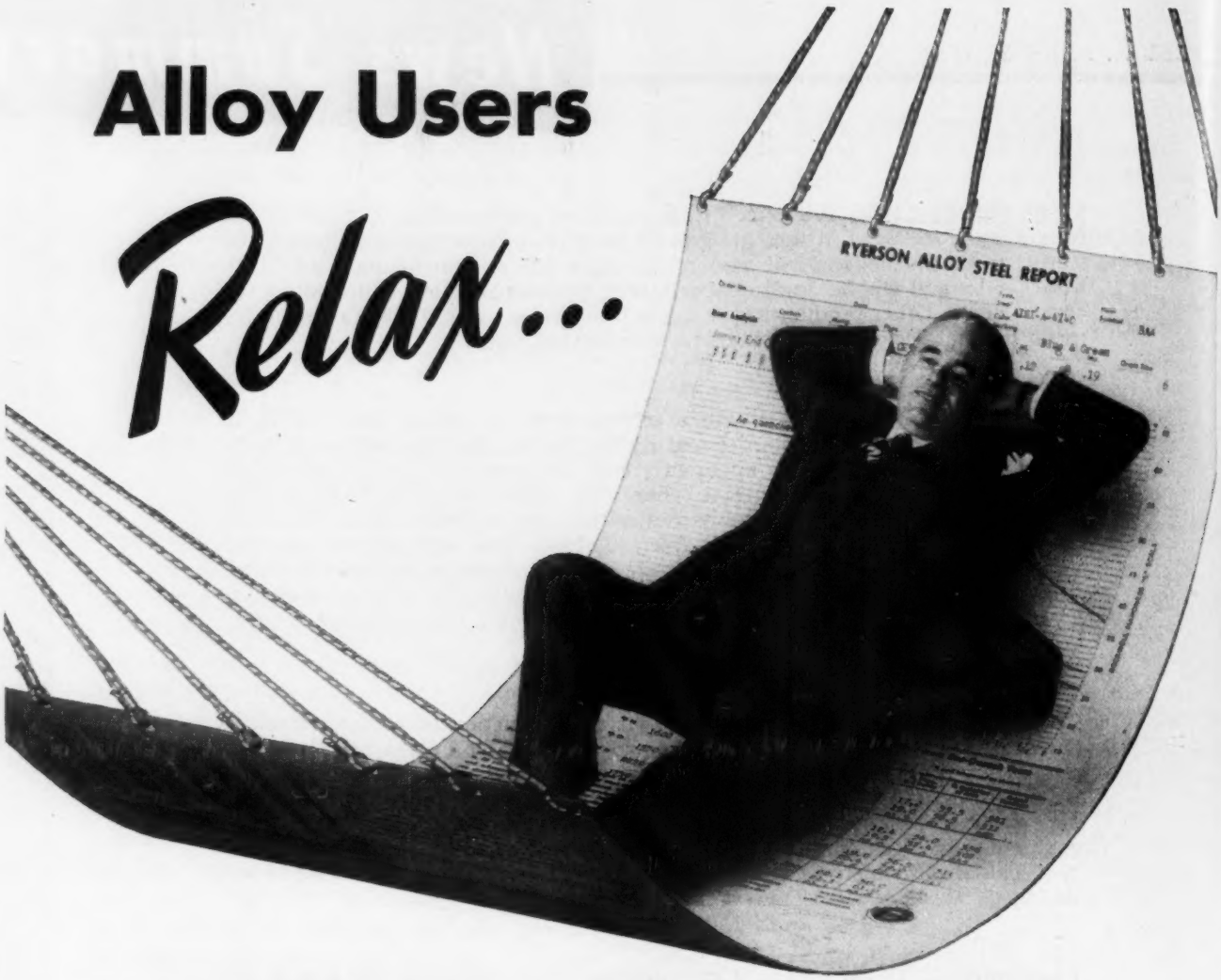
EARNINGS— Dollar profits of steel producers were higher in 1947 than in any recent year, reflecting record peacetime production. Twenty-seven companies, representing 91 per cent of ingot capacity, earned $397 million, an increase of 59 per cent over strike-ridden 1946 (Insert following p. 78). However, 1947 earnings must be viewed in the light of inflated costs and prices. Inflation hits the steel companies—buying goods, labor and new facilities—just as it hits the wage earner. It also hits the stockholder who depends on the wages of his invested capital for his livelihood.

FREIGHT RATES RAISED—Costs of steel producers and metalworking companies have been boosted by another increase in freight rates. The latest advance, averaging 4 to 5 per cent, is expected to shrink further the territory steel mills are willing to serve (p. 79). Since last October, freight rate increases are estimated to have added $2 a ton to steel production costs.

NAVY YARD WAGES—Brass hats of the Navy are opposing a proposal to give labor unions greater power to fix wages in Navy yards and shore establishments on the ground that such a setup would lead to "eternal wrangling" over rates and would kill off the authority of the Navy to use time-study methods in setting pay rates.

SIGNS OF THE TIMES—Experiments in concentrating taconite are being carried on in Oliver Mining Co.'s new ore research laboratory at Duluth (p. 84) in anticipation of the time when high-grade ore deposits are exhausted. . . . Hearings on the Federal Trade Commission's charge against steel pricing policies have been resumed (p. 73) in Washington . . . Ford has announced four body styles for the new Mercury (p. 87), embodying many new design trends. . . . What does a 70-group air program involve? STEEL asked the Air Force which supplied the answers (p. 75) . . . General Electric Co. and Westinghouse Electric Corp. have reduced prices of certain apparatus by 5 per cent (p. 77).

Alloy Users *Relax...*



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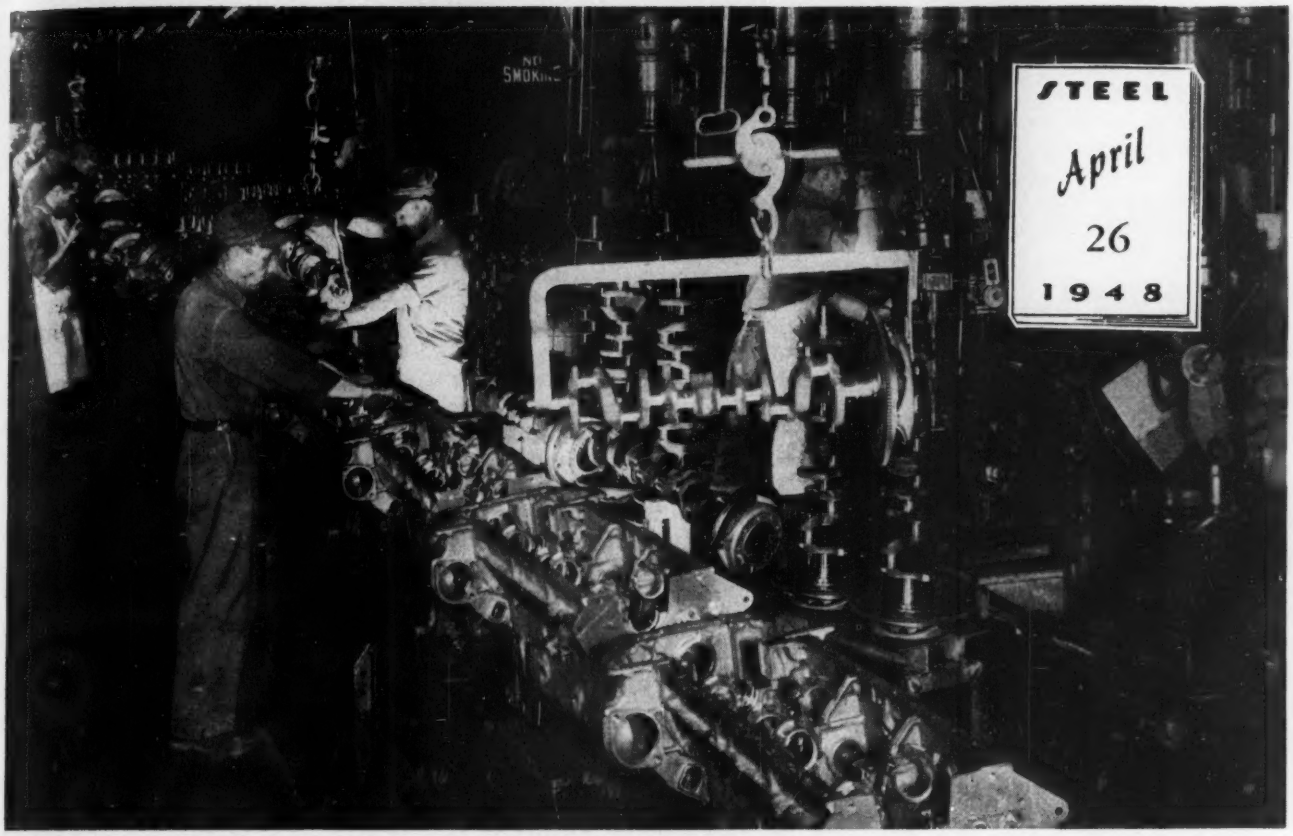


Metalworking plants are beginning to feel the impact of the coal mine strike, which started six weeks ago. Shortage of steel is forcing many plants to close. Shown above is the Pontiac Motor Division of General Motors, idled for want of steel

Coal Strike Depletes Steel Stocks

Metalworking companies begin to curtail operations due to lack of steel and pig iron. Full impact of loss not to be felt until later. Ingot loss near 1.5 million tons

STEEL production losses caused by the coal strike, estimated at 1,330,000 tons of ingots to the end of last week, are disrupting operations in some metalworking plants. Several hundred thousand employees in these plants have been idled or are losing time. Output of thousands of new automobiles, freight cars and other needed equipment is being lost.

Full impact of the loss in steel output will not be felt until later, however. Most steel consuming plants have been able to maintain operations at prestrike rate by drawing upon their meager stocks of steel. These are now depleted or nearly so and the next few weeks will witness closings for lack of material and to accumulate inventories.

Shortage of pig iron and steel has caused General Motors Corp. to close down foundries, machine shops and press rooms of all automotive divisions. About 200,000 employees are affected. GM hopes to be able to resume operations May 3.

Steel Loss To Increase—Several hundred thousand tons of ingot production will be added to the 1,330,000 already lost before steel mills can get back to prestrike operations. It now appears that the industry will be able to make little or no headway this year in bringing supply and demand into balance. Some progress in this direction was anticipated. The coal strike losses, coupled with the increased requirements for foreign aid, military preparedness and favored domestic programs, have dissipated hopes for an early balance.

Steel shortages are certain to affect all industry, both large and small, to a crippling extent. Consumers have no reservoir upon which to draw. Warehouse stocks are the lowest and most unbalanced in many months and quotas for distributors are being earmarked for reductions, as are the quotas for mill buyers. This situation will be a blow to small manufacturers who in many cases have no sources of supply other than the warehouses.

Gray Market Stimulated—This situation is causing many consumers to turn to the steel gray market, where supplies are tight and prices are sharply higher than a few weeks ago. Steel consumers whose inventories have been thrown out of balance by the coal mining disruption appear willing to pay outrageous prices for the steel they need to keep their plants operating.

Renewed interest in conversion deals is being evidenced.

Coal Is Crucial—At the close of last week, coal production was approaching normal and indications were that practically all the miners

would be back at work this week. Should coal production continue, producers in most districts expect to effect a substantial recovery in ingot production by the end of this week. Recovery in finished steel output will be slower, as producers' stocks of semifinished have been depleted.

Once coal shipments are received by the mills in volume and facilities are again in operation, ingot production should reach a new high rate for the year. Scrap stocks have been built up somewhat during the coal strike, scrap collections are increasing with the return of good weather, and the shortages of gas and fuel oil which restricted operations during the winter should be past.

New Crisis in July — Still unresolved is the question of what John L. Lewis will do at the end of June when the miners' contract expires. Will he again call out his miners to enforce demands for a third round wage increase? With coal stocks depleted by the recent walkout, a new cessation of mining would be almost immediately reflected in curtailed steelworks operations.

The fines imposed last week on Lewis and the union for contempt of court are not interpreted as stiff punishment. The penalties ($20,000 on Lewis personally and $1,400,000 on the union) are dwarfed by the loss in wages suffered by the miners during the walkout which continued sporadically over six weeks. The wage loss is estimated at $150,000,000, more than a hundred times the penalty assessed by the court. Actually the contempt fines amount to only $3.50 to $4 per union member, and can be paid out of a well filled union treasury.

How the steel production loss is affecting the metalworking industries in leading districts is summarized below:

Effects Delayed

Cleveland—The coal miners' work stoppage has thus far caused little disruption to steel supplies of metalworking companies here, but they expect effects to be increasingly noticeable in about a week or ten days.

However, when effects do hit the metalworking industry it is expected they will continue for some weeks. By that time the supply problem probably will be worsened by effect of summer vacations on steel mill production.

First effect of the miners' work stoppage on steel supply will be unbalancing of inventories, thereby making it difficult or even impossible for metalworking companies to continue operations.

Worse Disruption To Come

Pittsburgh—Growing shortage caused by the coal strike has not yet forced substantial curtailment in metalworking operations in this area However, fabricators expect the full impact of the disruption to production will develop over the next couple of months.

Some companies have gone to a five-day week, cutting out overtime; some are staggering work schedules.

Auto Plants Affected

Detroit—Shortages of coke and pig iron have had more immediate effect on curtailment of manufacturing operations in this area than the disruption of steel shipments, although it is expected that scores of parts suppliers are being or will be hit by the snarling of steel delivery schedules arising out of the coal strike.

Foundries, machine shops and pressed steel departments of all General Motors divisions closed last Friday for a one-week shutdown to permit acquiring inventories. Shipments of foundry coke were scheduled to be resumed this week from sources which had cut off deliveries entirely. Assembly plants were not immediately affected, although eventually they will be, when stock of parts have been exhausted.

Suspension of bessemer converter steel production has interrupted the shipments of bessemer screw stock and this is bound to have a slowing effect on screw machine plants.

Chicago Loss Slight

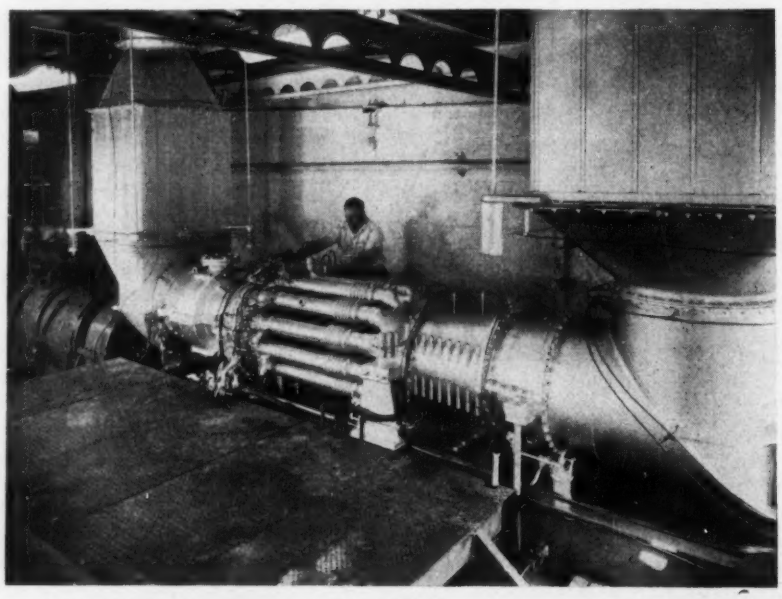
Chicago—Consumers of steel have yet to feel the worst of the reduced supply brought about by the recent month-long cessation in coal mining. Steel mills in the Chicago district maintained high-level production until closing phases of the strike but at that point dwindling coal stocks forced curtailments. Less steel was made last week than in the preceding week and at least 14 days or more will be required to restore schedules to prestrike level.

This district suffered proportionately smaller loss of steel output than most other regions during the mine shutdown and it is the tonnage being lost currently that will affect users in months to come. Mills will end second quarter with substantial carryovers in all products. Since this tonnage can not be made up, producers have no recourse but to reduce customer quotas for third quarter, an adjustment that will be forthcoming in two or three weeks.

Inventories Depleted

Philadelphia—Most metalworking shops in the Philadelphia district have up until recently been able to

(*Please turn to page* 164)



IRON HORSE OF FUTURE: This 2000-horsepower gas turbine is being tested under simulated railroad operating conditions at Westinghouse Electric Corp.'s Philadelphia plant. On the basis of more than 1000 hours of these tests, Westinghouse is building two similar machines for use in a revolutionary type main line locomotive powered with gas turbine-electric drive

Basing Point Hearing Resumed

President of American Iron & Steel Institute called as first witness but most of time is taken up by arguments of counsel as to admissibility of evidence

WITH introduction of price data and other preliminaries out of the way, strategy of opposing counsel in the Federal Trade Commission's action against alleged price fixing and collusion in the steel industry is beginning to emerge.

Hearings last week were taken up largely by arguments of the attorneys as to admissibility of evidence, and the rulings of the trial examiner.

The first witness called by the government, Walter S. Tower, president, American Iron & Steel Institute, was asked fewer than two dozen questions during a whole day's occupancy of the stand.

Ruling Deferred — Trial Examiner Frank Hier deferred until later his ruling on the materiality and relevancy of the Steel Products Manuals of the American Iron & Steel Institute and advised steel counsel in the meantime to prepare "intelligent and specific" objections. Trial Attorney Lynn C. Paulson is seeking to show that these manuals are essential to the operation of the alleged steel price conspiracy.

Porter Chandler, AISI counsel, sought to prove that the AISI manuals constitute a steel technical and metallurgical library and he pointed out that a good many of these books covered such subjects as the NE wartime steels, the wartime steel specifications of the Soviet Government Purchasing Commission, the British specifications for standard gas and steam pipe, etc.

Paulson Disappointed — Mr. Paulson expressed disappointment over not receiving minutes of the proceedings of the General Technical Committee under whose supervision the products committees of the institute function. Mr. Tower explained that the General Technical Committee and the products committees keep no record as to "what one man tells the others in these meetings." Mr. Tower said the manuals themselves are the only minutes of the meetings out of which they evolved. It would not be possible to keep detailed minutes of the meetings, said Mr. Tower.

Trial Examiner also deferred a ruling on the admissibility of evidence covering operations of the steel code authority under NRA. Attorney Paulson sought to show that the freight rate tariff book published for the steel code members during the NRA period was necessary to enable the members to sell at a uniform agreed set of prices. He wanted to use this background to show that the freight tariff books published by the AISI since NRA are put out for the same purpose—of assisting the steel companies in carrying out alleged price conspiracies.

Books Are Different—In one important respect, said Mr. Tower, the books are different. During the NRA period, the freight rate books listed freight rates from steel basing points to points of destination. Since NRA the books have listed freight rates from all steel producing centers to points of destination. Reason for issuing the books, he explained, is that the only up-to-date official freight rate card for Official Classification Territory shows rates only between points in Official Classification Territory. The books of the AISI are helpful, he said, in that they show freight rates from points inside and outside of that territory to other points outside and inside of that territory—in other words, the rates on through steel shipments without regard to freight classification territories.

Attorney Paulson in his interrogation of Mr. Tower sought to prove that freight rate tariff books published by the institute are essentially price books in that they list the freight rates which are to be added to f.o.b. mill prices to get the delivered price at destination.

Under questioning as to who did the actual work of computing these books, Mr. Tower said the institute never had a freight rate staff of its own and that freight tariff books were prepared under direction of the institute's Traffic Committee with traffic departments of various steel companies doing the actual work.

Present, Past and Pending

■ PLANT BEGINS TO ROLL STEEL FOR HUDSON
NEW CASTLE, PA.—Valley Mfg. Co. began last week rolling steel sheets for its parent company, Hudson Motor Car Co. Production started on one finishing mill, with additional mills expected to begin operations soon.

■ METALS TO BE SOLD THROUGH COMPETITIVE BIDS
WASHINGTON—With more than 90 per cent of its inventory of surplus metals and metal products disposed of, War Assets Administration will offer on a competitive bid basis the remainder, except steel sheets and standard-size pipe.

■ TRACTOR PRODUCTION STARTS AT GADSDEN PLANT
BIRMINGHAM—Limited production of its new rear-engine farm tractor has been started by Allis-Chalmers Mfg. Co. in its newly acquired plant at Gadsden, Ala.

■ RAILROAD SCRAP DRIVE NETS 220,000 TONS
WASHINGTON—More than 220,000 tons of scrap metal were collected by railroads during their scrap drive week which ended Apr. 10. This is three times the average weekly collections of last year.

■ NAVY TO BUY U. S. STEEL'S SHIPBUILDING YARD
KEARNY, N. J.—The Navy has accepted an offer under which it would purchase for $2,375,000 the shipbuilding yard and principal facilities here of Federal Shipbuilding & Dry Dock Co., a U. S. Steel Corp. subsidiary.

■ FREIGHT CAR ORDER BACKLOG INCREASES
WASHINGTON—New freight cars on order climbed to 126,028 on Apr. 1 from 121,936 on Mar. 1, says Association of American Railroads. Also on order Apr. 1 were 1550 locomotives, including 1430 diesels.

■ HOPES TO FORMULATE AID PROGRAMS SOON
WASHINGTON—Paul G. Hoffman, European Recovery Program director, hopes to have sufficient understanding of immediate European requirements to formulate preliminary aid programs in steel and machinery in the next six weeks.

U. S. Steel To Cut Prices May 1

Denies steelworkers' demands for "substantial" wage increase in move to combat inflation. Reductions will amount to $25 million annually; affects cost-of-living

PRICES on a wide variety of its products will be reduced May 1 by the United States Steel Corp. The reductions will amount to about $25 million annually and will be applicable primarily to those products which have a more or less direct bearing on the cost of living.

Demands by the United Steelworkers of America-CIO for a "substantial" wage increase have been denied by U. S. Steel which announced it was making the two moves—cutting prices and holding the wage line—in "an endeavor to aid in halting further advances in living costs."

Philip Murray, president of the United Steelworkers, after hearing of the wage increase denial, said the steelworkers will stand by their no-strike contract.

Cuts To Vary—"These price changes are estimated to add up to a total price reduction by U. S. Steel of about $25 million a year based on last year's shipments of the products affected," said B. F. Fairless, U. S. Steel president. "The price reduction will vary in amount for different products. No changes are to be made in the prices of certain products, such as semifinished steel, where the relationship between present prices and costs does not permit a price reduction at this time. The new changes involve a total price reduction more than twice as large in amount as the total increases last February in our prices for semifinished steel.

"So far as possible, the price reductions will be made applicable to steel products which have a more or less direct bearing upon the cost of living. As illustrations, lower prices will be applicable to a number of steel products which are bought by the consumer in the form in which they are manufactured by our subsidiaries, such as nails; wire fence; wire netting; steel fence posts; steel roofing and siding sheets for buildings; barbed wire and other wire products; and also to a number of steel products which are converted by our customers into articles for ordinary use by homeowners, such as tin plate for the manufacture of cans; cold-rolled strip and sheets for automobiles; stainless steel for refrigerators, stoves, kitchen cabinets, washing machines, etc.; sheets for furnaces, air-conditioning ducts, and heating equipment; galvanized sheets for silos, grain bins and other farm structures; spring wire for furniture and other uses; as well as many other steel products.

"We, in United States Steel, believe that costs and prices in general are too high today for the good of the nation. We are firmly of the conviction that American industry and labor should co-operatively do everything in their power to avoid further increases in costs, which, if permitted to occur, must result in higher prices for almost everything we buy. Certainly the best interests of all of our people will not be served by a further lowering in the purchasing power of the dollar.

Hopes for Stabilization—"We are hopeful that our action in reducing the prices of a number of steel products associated with the cost of living may have a beneficial effect throughout the nation and may be helpful in bringing about an early stabilization or reduction in the cost of living. To achieve this worthy result, there must be co-operation by both business and labor and the government. If this should prove to be the outcome, everyone in this country will benefit. If, on the contrary, costs should continue to advance, then in fairness to our employees and to our stockholders we will have to consider at some later date the adequacy of both wages and steel prices under then existing conditions.

"Over the past few weeks our steel producing subsidiaries have been engaged in negotiations with the United Steelworkers of America-CIO in connection with the request of the union for a substantial wage increase. We have told Mr. Philip Murray, the president of the union, that in our judgment the granting by us of such a wage increase will not in the long run bring benefit to anyone, as it will lead to similar substantial wage increases in other industries and to higher prices generally. The reply which we gave yesterday to Mr. Murray was that, in the light of this conviction, we cannot grant his request for a substantial wage increase to our steelworkers, as such an increase would make necessary a general advance in our steel prices. We are unwilling so to increase steel prices at this time, as we believe this would be inimicable to the best interests of the nation.

Earnings Declining—"While increases in our prices for certain steel products have been announced from time to time since August 1, 1947, our costs have gone up to a greater extent with the result that the earnings statement of United States Steel for the first quarter of 1948 to be released shortly will show a lower profit for the first quarter of this year than for first quarter of 1947.

"In an endeavor to do what is within our power to assist in halting the upward trend of costs and prices, we have adopted the course which I have outlined. We have not been content just to sit by inactive and hope. We have concluded that definite action on our part is advisable in the way of steel price reductions over a broad field.

"Average straight-time hourly earnings of our steelworkers were 83.9 cents in 1940. In February, 1948, their average straight-time hourly earnings were $1.454, an increase of 73.3 per cent over those in 1940. Their actual average hourly earnings were $1.55 in February, 1948, as compared with 85.5 cents in 1940, an advance of 81.3 per cent since 1940. Actual average weekly earnings of our steelworkers advanced 91.7 per cent between 1940 and February, 1948, namely, from $31.38 to $60.14 a week."

Steelworkers Ask Security Plan

A COMPREHENSIVE program of social security benefits for steelworkers and their families is being asked of the steel industry by the United Steelworkers of America-CIO. Included in the demands are life insurance, disability benefits (sickness and accidents, including non-occupational), hospitalization and surgical.

Under the union proposal all costs would be borne by the industry. These costs are estimated at 9 cents per hour per employee.

Details of the union's plan are being closely guarded among top officials of the union and company managements.

Immediate Action Unlikely—While negotiating officials are keeping mum on the whole problem, other indus-

(*Please turn to Page* 162)

POWER TAKEOFF: Boeing XB-47 Stratojet, the U. S. Air Force's newest bomber, zooms skyward under impetus of 42,000 pounds of thrust. Curving smoke trails are from the 18 JATO (jet-assist-take-off) rocket units, mounted integrally in the bomber's fuselage. Six General Electric J-35 turbo-jet engines, each developing 4000 pounds of thrust, are slung beneath the slim swept-back wing to provide normal power. The Stratojet is in the same weight class as the Boeing B-29 Superfortress

70-Group Air Program Detailed

WHAT is the 70-group air program voted by the House and now awaiting Senate action? STEEL submitted this question to the Department of the Air Force and obtained these answers:

Number of planes per group in the various classifications is as follows: Heavy bomb 18, medium bomb 30, light bomb 48, fighter 75, all-weather fighter 36, tactical reconnaisance 54, long-range reconnaisance 36, medium troop carrier 48, heavy troop carrier 36.

Planes Composing Groups—Types of planes composing these groups, and the number of groups in each classification, are:

21 heavy bomb groups, B 29, B 50 and B 36. (B 29 and B 50 are classed as medium and B 36 as heavy. B 50's now are starting to come off the production lines, but it will take "several" months to get the bugs out of the B 36 prototypes and put this model into production.)

5 light bomb groups, B 45 and A 26. (B 45 is a jet plane now in volume production.)

22 fighter groups, P 51, P 80 and P 84. (P 80 and P 84 are jet planes now in volume production.)

3 all-weather fighter groups, P 82 and P 61.

4 tactical reconnaisance groups, A 26, P 80 and P 51. (These are specially converted planes with cameras, etc. P 80 is a jet plane.)

5 long-range reconnaisance groups, B 29.

10 troop carrier groups, C 82, C 54 and C 119.

National Guard Planes—In addition, the program calls for 27 groups for the Air National Guard, and 34 groups for the Air Reserve. The Air National Guard is to have 24 fighter and 3 light bomb groups.

The output of new planes called for under the bill is as follows for these fiscal years: 1512 in 1949, 2174 in 1950, 3000 in 1951, 5000 in 1952, 5268 in 1953—and thereafter at the rate of 5268.

Cost of the program is such as to cause delay in the Senate over the prospect that it will lead to a resumption of deficit spending.

The bill passed by the House and now before the Senate provides $3,198,000,000 for fiscal 1949 which breaks down as follows: $2,045,100,000 new funds and contract authorizations for planes, "guided missiles and equipment" for the Air Force; $753,000,000 new funds and contract authorizations for Naval aviation; and $400,000,000 cash for both arms to pay for prior contracts.

Additional Appropriations — Additional appropriations to carry out the program, it now is estimated, will be needed in these amounts: $5.2 billion in 1950, $6.5 billion in 1951, $7.3 billion in 1952, $7.5 billion in 1953—and $7.5 billion per year thereafter.

But that is not all. General Omar Bradley, Army chief of staff, estimates that a properly equipped 837,000-man force will be needed for all purposes, including furnishing the defenses and services to enable the 70-group Air Force to be fully operational.

The Senate Armed Services Committee has been informed by Secretary Forrestal's office that, on the basis of a 70-group Air Force, the total military outlay in fiscal 1951 will be $21.5 billion. This does not include an estimated $3.5 billion for universal military training, merchant ship construction, stockpiling, and cost of training reserve components.

Careful study of the House debate, and of the committee proceedings, reveals that, if the Senate follows the House lead, the Air Force now is to become our first line of defense, thus supplanting the Navy in that category. The House was confronted with demands which, if granted in full, would have led to early national bankruptcy. And there was the fear that much of the huge expense would prove wasteful due to the rapidity with which key military offense and defense weapons are obsoleted. So the 70-group program was adopted for these three reasons: 1—A large air force would be our most potent weapon in a war with Russia; 2—a large air force would compel greater respect and world prestige for the United States, and 3—a large air force, vigilant and adequately equipped, would protect us against a blitz and thus purchase time for all-out mobilization.

Truman Pressing for Controls

Pressure for mandatory economic powers expected to increase as impact of European recovery and defense programs is felt. Voluntary allocations program pushed

MOUNTING pressure from the administration for mandatory controls over the economy is expected as the European recovery and national defense programs get into high gear with resulting increases in demand for scarce materials, such as iron and steel. However, indications last week were that such controls would be resisted by the Republican majority in Congress at least until such time it was conclusively demonstrated inflation could not be stemmed in any other way.

The reaction of the Republican majority to President Truman's latest request for a rigid anti-inflation program, expressed in an address at a meeting of the American Society of Newspaper Editors, was anything but encouraging to control proponents. The fact is the legislators are definitely opposed to any new wage, price and rationing controls.

Sees Shortage Intensified—President Truman, in his address to the editors, said the $4.8 billion tax reduction will add to the inflationary pressures at work, and he declared that the expanded defense and European recovery programs will aggravate basic materials shortages which the country has been wrestling with for months past.

In official Washington circles the view is widely held that more than voluntary allocations of such scarce materials as iron and steel will be necessary if available supplies are to be equitably distributed. They point to the increasing shortage difficulties in iron and steel which are bound to be felt as result of the loss of well over 1 million tons production due to the coal strike.

Meanwhile, progress continues in the formulation of the voluntary allocations program.

Representatives of the steel warehouse industry met last week with officials of the Department of Commerce and recommended appointment of two industry advisory committees to consult with the department. The industry representatives expressed their desire to co-operate with the government in working out on a voluntary basis problems of distribution and other factors that might alleviate to some extent the present difficulties small businesses have in obtaining supplies of scarce steel products.

Because of the nature of the industry it was recommended that two advisory committees be appointed representing the two major segments of the industry: (1) Steel Distributors Industry Advisory Committee, and (2) Merchant Steel Products Distributors Industry Advisory Committee. The latter industry handles what are generally known as merchant or hardware items, such as nails, barbed and smooth wire fence, sheet roofing, steel sheets and similar items.

The secretary of commerce will appoint the members of these two committees to be composed of small, medium and large concerns. Consideration will be given to their geographical location.

Statements were presented by the following representatives of the industry: C. H. Bradley, president, W. J. Holiday Co., Indianapolis; L. Worthington, president, U. S. Steel Supply Co., Chicago; Henry J. Allison, president, Grammer, Dempsey & Hudson, New York; Everett Graff, president, J. T. Ryerson & Sons Co., Chicago.

It was pointed out that steel warehousers and distributors handle a substantial amount of the total output of finished steel products and that in most cases small manufacturers and users normally buy from these distributors rather than directly from the steel mills. It was also stated that because of the current short supplies of steel products an increasing number of buyers are turning to the warehouses for their steel.

Congressman William S. Hill of Colorado, of the House Small Business Committee, addressed the meeting as did Paul O. Peters, staff investigator for the House Small Business Subcommittee.

Decline Participation—Last week representatives of the gypsum board and lath industry at a meeting with the OIC decided no voluntary agreement for the industry was needed at this time. This is the second industry to decline allocation assistance. Some time ago the farm equipment interests decided against seeking aid through a voluntary program.

Representatives of the cast iron low pressure boiler and radiation industry, however, have recommended appointment of an industry advisory committee to delevop a voluntary agreement. This committee would help work out a program for aiding the industry to acquire pig iron for 1948 housing requirements. Industry representatives stated anticipated demands for cast iron boiler and radiation cannot be met unless there are more raw materials.

Expect German Scrap Flow Soon

FERROUS scrap, so badly needed to support present steelmaking schedules, should start to come from Germany in the near future, according to John L. Tappin, Commerce Department, testifying to the Macy Subcommittee to Investigate Questionable Trade Practices, on Apr. 19.

He did not mention any definite figures, but talk in informed quarters is to the effect that 500,000 to 1 million tons of German scrap will be shipped to the United States as fast as arrangements can be made.

Specifically, the immediate aim is to by-pass, for the moment, the Marshall Plan provision that scrap in Germany is to go to the participating European nations and to the United States. Government officials concerned with the problem of getting this scrap here fear that an indefinite delay would result from prior consultation with all parties involved.

To Go Ahead—Present intention is to go ahead immediately and negotiate later when the circumstances permit. In view of the recent estimate of the Haynes committee that German scrap comes to around 10 million tons, it is felt that 500,000 to 1 million tons could be brought here immediately without prejudicing the interests of other claimants to this scrap.

Under an Apr. 3 directive by John R. Steelman, assistant to the President, the Commerce Department is charged with co-ordination of all current government activities aimed at stimulating the flow of scrap. Under this directive, Mr. Tappin told the Macy subcommittee, Commerce has taken steps to organize an Interdepartmental Scrap Committee which is to address itself immediately to the problem of bringing in German scrap. This is to include a representative of the Steel, Foundry & Scrap Industries Committee for Expediting Iron & Steel Scrap; he is to serve in a consulting, advisory capacity. Government departments to be represented include State, Army, Navy,

National Security Resources Board, Maritime Commission, War Assets Administration, Economic Co-operation Administration.

Prompt Action Urged — Prompt government action to return to American steel mills millions of tons of idle overseas and domestic scrap was urged by L. D. Greene, member of the Steel, Foundry & Scrap Industries' Committee for Expediting Iron & Steel Scrap.

Appearing before the Macy subcommittee, Mr. Greene emphasized that the chronic postwar scrap shortage has been a major factor in preventing capacity production by the steel industry.

Points Out Danger—Pointing out the grave danger to America if a war emergency caught industry with scrap inventories as low as they are now —less than one-half the stockpile just prior to Pearl Harbor — Mr. Greene listed the following sources of scrap to refill the nation's depleted reservoir: (1) The Bizonal area of Germany, from which 3 to 10 million tons of scrap could be returned without interference with German recovery; (2) substantial tonnages in Japan; (3) substantial tonnages in France, Belgium, Luxemburg, Denmark, and other European countries which could be made available in exchange for aid furnished under ERP; (4) large tonnages of potential scrap held in this country by the armed services and other government agencies in the form of surplus material.

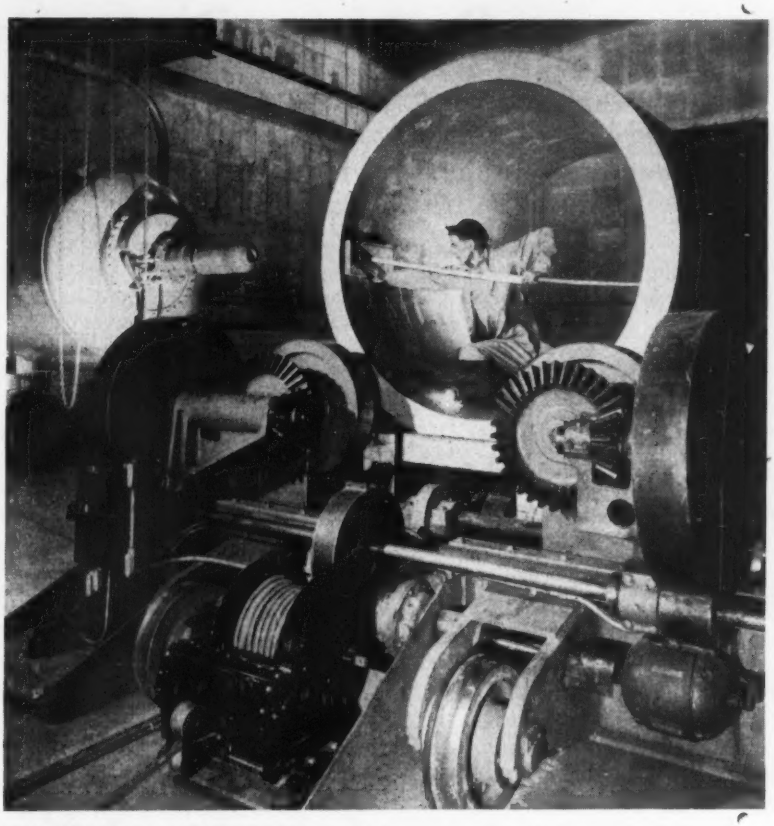
GE, Westinghouse Cut Prices on Some Items

General Electric Co., Schenectady, N. Y., and Westinghouse Electric Corp., Pittsburgh, have reduced prices 5 per cent on certain products.

Retroactive to Apr. 16, the GE move is the second such action this year, the company having lowered prices 3 to 10 per cent on Jan. 1 for certain products.

The latest GE cut will amount to a saving of nearly $10 million annually to GE customers, according to Charles E. Wilson, president. Earlier reductions were estimated to amount to savings of $50 million to ultimate consumers in 1948. Products affected by the new reduction are fractional horsepower motors, switchgear, conventional transformers, lightning arresters, feeder regulators, cutouts and power capacitors.

The Westinghouse reduction is effective immediately on virtually all types of fractional horsepower electric motors. The cut will save buyers over $1 million a year.



TWO-MILLION VOLT X-RAY: Weld examinations on large pressure vessels and boiler drums are speeded up by this 2,000,000-volt x-ray machine (extreme left) at the Barberton, O., plant of the Babcock & Wilcox Co.

Tool Builders Set for Upswing

WITH WASHINGTON policymakers not yet in accord over the final size and shape of the preparedness program, machine tool builders have no definite indication of the role they will be called upon to play.

It is expected in the trade that some indeterminate amount of future business will be placed as result of increased armament expenditures, particularly for aircraft. But currently, only a few orders bear earmarks of being of a military nature, and these probably have been placed by firms which have been awarded educational-type government orders.

In the builders' view, production of nearly all war materiel could be stepped up somewhat without new tools being required. Beyond some point, however, large-scale military preparations would mean large-scale machine tool buying, as in the last war, the builders say.

Capacity Adequate — It is anticipated that any considerable spurt in tool ordering could be handled by most builders in their present facilities without delay for retooling.

Passage of the Foreign Assistance Act brings nearer the day when machine tool interests will start receiving foreign orders in volume, but the trade expects it may take as long as several months before the aid money can flow out of this country and then filter back again to be used for machine tool purchases.

Some foreign ordering of course is being placed without benefit of aid funds. Such an order, rather sizable by current lights, was placed recently with a Cleveland builder by Italian interests.

Sales Above Expectations—Current domestic market for machine tools is relatively quiet, but is generally sustained at a higher level than many in the industry believed it would be at the first of the year. March volume of new orders was about 10 per cent higher than February's, although shipments were off slightly. For the first quarter, National Machine Tool Builders' Association reports, orders were about 20 per cent higher than for the comparable 1947 period; shipments were down about 10 per cent.

Lubrication Problems Discussed

Twenty-three technical papers presented at Buffalo meeting of ASLE. Equipment show held in connection with convention participated in by 30 companies

BUFFALO — That lubrication of industrial machinery and metalcutting tools now is a recognized branch of the engineering profession was amply proved by the size and technical caliber of the third annual convention, American Society of Lubrication Engineers, Hotel Statler, Buffalo, Apr. 19-21.

This convention, and parallel exhibition of lubricating equipment and materials participated in by 30 leading companies in those fields, was attended by 615 men, representing industries and engineering colleges throughout the United States and Canada.

The convention, which was opened by Mayor Bernard J. Dowd of Buffalo, featured 23 technical papers dealing with training of lubrication engineers, design of lubrication systems, bearings both plain and antifriction, chemistry and physics of lubricants, cutting oils and compounds and theory of action, physical, chemical and functional tests of lubricants, filters, and synthetic oils and greases.

Tool Men Among Speakers—Among the speakers were representatives of three of the largest machine tool companies which have been conducting "extensive laboratory and practical" experiments on the selection and use of lubricants and coolants in connection with modern high speed cutting and grinding operations. It was noticeable that modern laboratory methods, including high speed photography have upset some of the preconceived notions as to what cutting fluids actually do.

The same can be said of the use of plastic models as far as lubrication is concerned. Motion pictures of such transparent models of plain bearings in operation proved that they act as pressure pumps on one side and suction pumps on the other, making it necessary to locate oil holes and oil grooves so as to take advantage of these characteristics. These models likewise proved that by actually floating shaft and slides, thus doing away with metal to metal contact, the power required to move the mechanism is reduced to a minimum as also is the wear.

Trend From Natural Oils—Several of the speakers pointed to the trend away from natural oils and fats of animal and vegetable origin, toward compounded mineral and synthetic lubricants actually tailored to suit particular needs, including those involving extreme pressures and high temperatures. Among the newer lubricants, those known as silicone compounds aroused lively interest.

In discussions revolving around training of lubrication engineers in colleges and universities, general opinion seemed to be that the procedure should be to go through with regular mechanical engineering courses for four years, followed by a postgraduate year of specialization.

Newly elected officers of the society are: President, G. L. Sumner, Westinghouse Electric Corp., Pittsburgh; eastern vice president, C. M. Larson, Sinclair Refining Co., New York; midwestern vice president, C. Penfold, Armour Research Foundation, Chicago; western vice president, C. R. McClennan, Union Oil Co. of California. W. F. Leonard was reelected secretary and treasurer, and B. H. Jennings, Northwestern University, vice president-at-large.

Guest speaker at the annual banquet was Dr. Clifford C. Furnas, director, Cornell Aeronautical Laboratory, Buffalo.

Ceramic Society Gathers In Chicago, Apr. 25-30

Technical developments and new applications will be among the subjects discussed at the fiftieth annual meeting of the American Ceramic Society at the Palmer House, Chicago, Apr. 25-30.

Developments in fiberglas, use of ceramics in housing, new equipment for porcelain plants and tunnel kilns and industrial design are among the subjects to be reviewed.

Calendar of Meetings . . .

Apr. 26-27, Association of Iron & Steel Engineers: Annual spring conference, Hotel Statler, Buffalo. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Apr. 26-28, American Mining Congress: Annual convention, Cincinnati.

Apr. 26-28, American Supply & Machinery Manufacturers' Association and National and Southern Supply & Machinery Distributors' Associations: Convention, Hotel Traynor, Atlantic City, N. J.

Apr. 26-29, Chamber of Commerce of the United States: Annual meeting, National Chamber Bldg., Washington.

Apr. 26-30, American Management Association: 17th annual packaging exposition, Public Auditorium, Cleveland. Association headquarters are at 330 W. 42nd St., New York.

Apr. 28-30, American Institute of Electrical Engineers: Northeastern district meeting, Hotel Taft, New Haven, Conn. Meeting is sponsored by Westinghouse Electric Corp.

May 3-5, Industrial Furnace Manufacturers' Association: Convention, The Homestead, Hot Springs, Va. Association headquarters are at 420 Lexington Ave., New York.

May 3-7, American Foundrymen's Association: 1948 foundry congress and show, Philadelphia.

May 3-14, British Industries Fair: Engineering industries will be represented at Castle Bromwich in Birmingham; and the lighter industries at Earls' Court and Olympia in London.

May 5-6, British Iron & Steel Institute: Annual general meeting, at 12 Great George St., London. Institute headquarters are at 4 Grosvenor Gardens, London.

May 6-7, National Highway Users Conference: Second highway transportation congress. Mayflower Hotel, Washington. Group's director is Arthur C. Butler, National Press Bldg., Washington.

May 7, Illinois Institute of Technology: Symposium on numerical methods of analysis, on its Chicago campus.

May 10-12, Canadian Association of Equipment Distributors: Fifth annual convention, General Brock Hotel, Niagara Falls, Ont.

May 11-12, American Steel Warehouse Association: 39th annual meeting, Drake Hotel, Chicago. Association president is Walter S. Doxsey, 442 Terminal Tower, Cleveland.

May 11-16, Franklin Institute and Juniors of Engineers' Club of Philadelphia: Second engineering progress show, 1317 Spruce St., Philadelphia.

May 13-14, American Management Association: Production conference, Palmer House, Chicago. Association headquarters are at 330 W. 42nd St., New York.

May 14-23, Buffalo Chamber of Commerce: Buffalo industrial progress exposition, 65th Regiment Armory, Buffalo. Chamber headquarters are at 238 Main St., Buffalo.

May 15-22, International Petroleum Exposition: Texas Bldg., Tulsa, Okla.

May 16-22, Chamber of Commerce of the United States: World Trade Week. Associated with the promotion of the week is Kenneth H. Campbell, manager of Foreign Commerce Department.

May 19, Bituminous Coal Research, Inc.: Annual meeting, Columbus, O. Group's headquarters are at 912 Oliver Bldg., Pittsburgh.

May 20-21, National Welding Supply Association: Annual convention, Sheraton-Coronado Hotel, St. Louis. Association headquarters are at 505 Arch St., Philadelphia.

May 20-21, Society of the Plastics Industry: Annual meeting, Atlantic City, N. J. Society headquarters are at 295 Madison Ave., New York.

May 26-27, American Iron & Steel Institute: 56th general meeting, Waldorf-Astoria Hotel, New York. Institute headquarters are at 350 Fifth Ave., New York.

May 27-29, Automotive Engine Rebuilders Association: 1948 annual convention, Hotel Statler, Buffalo. Association headquarters are at 415 N. Capitol Ave., Indianapolis.

May 27-29, Society for Experimental Stress Analysis: Spring meeting, Roosevelt Hotel, Pittsburgh. Society address is P.O. Box 168, Cambridge, Mass.

May 31-June 2, National Association of Purchasing Agents: Annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 11 Park Pl., New York.

May 31-June 12, Canadian International Trade Fair: Coliseum, Toronto, Ont.

June 11-12, American Society of Metals: Sixth biennial Pennsylvania interchapter meeting of groups located wholly or partly in the state, State College, Pa.

Peacetime Output Record Reflected In Steel Producers' 1947 Earnings

A NEW peacetime high in production along with increased prices enabled the steel industry in 1947 to show net earnings considerably above those of 1946 but below those of the peacetime banner year of 1929. Net earnings per sales dollar were higher than in 1946 but were eclipsed in 1940, 1937 and 1929.

Although steel production in 1947 was below the all-time high set in 1944, price controls and wartime tax rates held the 1944 total of net earnings below that of 1947.

Laden with an unceasing flow of orders, the steel industry was able to operate at a high level in 1947 largely because it was free from major labor disruptions, in sharp contrast with 1946. Contributing also to the 1947 production attainments were modernization and expansion programs, which were showing their effects through both enlarged capacities and increased efficiencies of mill operations.

STEEL's annual financial analysis of the steelmaking industry shows that in 1947 twenty-seven ingot producers representing approximately 91 per cent of the nation's ingot capacity had aggregate net income after taxes of $397,355,070, a 59 per cent increase over their $249,009,351 in 1946. Any appraisal of the 1947 performance should not overlook the exceptionally high costs of plant and equipment replacement, and the fact the current rapid pace of production shortens equipment life.

Of the 27 companies, one shows a smaller net income in 1947 than in 1946, while one company reports its deficit in 1947 was smaller than in 1946. The improved earnings position of the industry enabled the average earnings per share of common stock to rise to $7.46 in 1947, compared with $5.03 in 1946. Preferred dividend requirements declined from $42,011,322 in 1946 to $41,539,829 in 1947.

Despite the favorable financial showing in 1947, the net income for the 27 companies averaged only $14,716,000 per company, in contrast to $18,746,000 for 18 companies in 1929. Similarly, net income per ton of ingot production in 1947 for 22 companies was $5.01, whereas for 18 companies in 1929 it was $6.42.

Although the industry's net sales and net income rose in 1947, its operating and replacement costs also continued to rise. In recognition of the latter, some companies in 1947 supplemented their depreciation and depletion charges with provisions to help cover high costs of replacements.

Total income before dividends and interest on bonds amounted to $416,514,547 in 1947, compared with $266,525,511 in 1946. Because of the jump in total income and an increase in capitalization from $4,096,561,467 in 1946 to $4,368,177,500 in 1947 the total income before dividends and interest on bonds in 1947 was equivalent to 9.54 per cent of the capitalization, up appreciably over the 6.51 per cent in 1946.

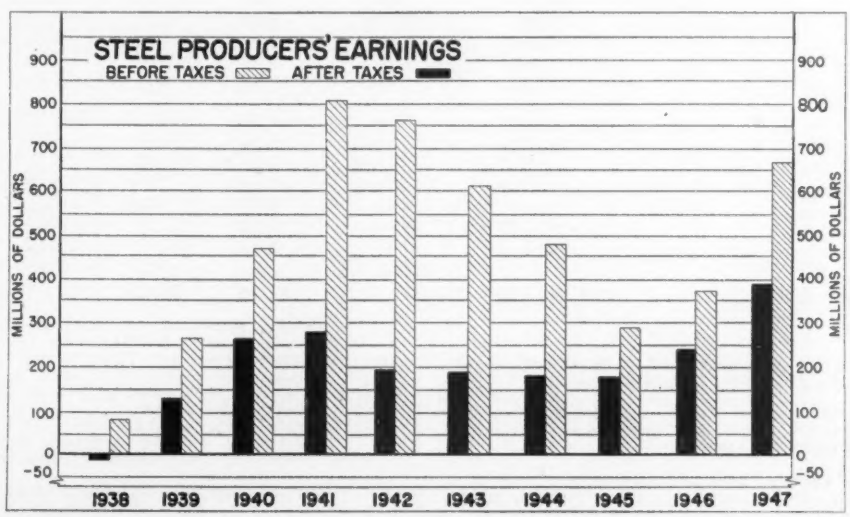
Reflecting the high rate of operations in 1947, twenty-two of the companies produced 72,946,395 net tons of ingots, equivalent to 93.47 per cent of their capacity. In strike-ridden 1946 their output was only 57,013,779 tons, equivalent to 75.29 per cent of their capacity. The high rate of production in 1947 enabled net sales and revenues of 27 companies to reach $6,417,311,331, compared with $4,558,210,924 in 1946. This increase, along with improvement in net income, pushed average net profit margin from 5.46 per cent in 1946 to 6.19 in 1947. This is contrasted with 6.87 per cent in 1937, and 7.48 in 1940.

By virtue of the increase in income, the total of federal income taxes for the 27 companies rose in 1947 to $269,665,986 from $120,154,507 in 1946.

Evidence of the industry's expansion to meet the heavy demand for steel is an increase by 25 of the companies of their total ingot capacity from 81,044,615 net tons in 1946 to 83,337,058 tons in 1947.

In operating at near-capacity levels, 26 of the steel producers had 739,451 employees in 1947, compared with 711,075 in 1946. Increased employment along with wage increases pushed total payrolls of 27 companies up 23.9 per cent.

Aggregate current assets and current liabilities both continued to rise in 1947 but because of the greater proportionate increase in the latter the ratio of current assets to current liabilities declined from 3.24 to 1 in 1946 to 2.66 to 1 in 1947.



	Number of Shares of Common Stock Outstanding		Common Stock Valuation		Preferred Stock Valuation
	1947	1946	1947	1946	1947
United States Steel Corp.	8,703,252	8,703,252	$652,743,900	$652,743,900	$360,281,1
Bethlehem Steel Corp.	8,954,982§	2,984,994	283,574,430	283,574,430	93,388,7
Republic Steel Corp.	5,669,922	5,669,922	130,309,141	130,309,141	28,214,3
Jones & Laughlin Steel Corp.	2,476,502	2,476,502	96,507,400	96,507,400	29,356,8
Youngstown Sheet & Tube Co.	1,675,008	1,675,008	105,088,053	105,088,053	None
National Steel Corp.	2,230,817	2,230,642	55,770,425	55,766,050	None
Inland Steel Co.	4,899,315	4,899,315	62,500,000	62,500,000	None
American Rolling Mill Co.	3,241,276	3,241,315	32,412,764	32,413,153	19,993,6
Wheeling Steel Corp.	569,559	569,559	28,477,950	28,477,950	36,316,9
Crucible Steel Co. of America	443,684	444,230	11,092,097	11,105,749	31,357,9
Colorado Fuel & Iron Corp.§§	1,126,175	1,126,975	5,633,875	5,634,875	10,056,3
Pittsburgh Steel Co.	508,917	508,917	4,862,190	4,862,190	16,438,2
Lukens Steel Co.	317,976	317,976	3,179,760	3,179,760	None
Granite City Steel Co.*#	382,488	382,488	8,483,821	8,483,821	None
Sharon Steel Corp.	617,242	617,242	6,232,810	6,232,810	None
Alan Wood Steel Co.	200,000	200,000	4,388,889	4,388,889	7,182,9
Midvale Co.	600,000	600,000	10,574,621	10,574,621	None
Allegheny Ludlum Steel Corp.	1,288,831	1,288,286	8,055,194	8,051,787	None
Continental Steel Corp.	501,370	501,383	7,018,970	7,019,263	None
Laclede Steel Co.	206,250	206,250	4,125,000	4,125,000	None
Keystone Steel & Wire Co.	625,000	757,632	2,604,167	3,156,800	None
Follansbee Steel Corp.†§	345,688	267,064	3,419,511	2,670,640	None
A. M. Byers Co.‡*	264,635	264,635	2,646,350	2,646,350	5,439,1
Copperweld Steel Co.	514,864	514,864	2,574,320	2,574,320	1,623,0
Northwestern Steel & Wire Co.	817,825‡†	163,565	4,089,125‡†	817,825	None
Rotary Electric Steel Co.	167,025	166,225	1,670,250	1,662,250	None
Carpenter Steel Co.§§	360,000	360,000	1,800,000	1,800,000	None
Portsmouth Steel Corp.#†	1,301,550	.....	1,301,550	.....	None
Total (or average)	47,709,203	41,138,241	$1,539,835,013	$1,536,367,027	$639,647,1

	Preferred Dividend Requirements		Earnings Per Common Share		Dividends Paid Per Share on Preferred		Dividends Paid Per Share on Common
	1947	1946	1947	1946	1947	1946	1947
United States Steel Corp.	$25,219,677	$25,219,677	$11.71	$ 7.29	$ 7.00	$ 7.00	$ 5.25‡
Bethlehem Steel Corp.	6,537,209	6,537,209	4.98	11.79	7.00	7.00	6.00
Republic Steel Corp.	1,692,858	1,692,858	5.17	2.53	None**	None**	2.00
Jones & Laughlin Steel Corp.	1,467,840	1,649,244	8.45	3.67	5.00	5.00	2.00
Youngstown Sheet & Tube Co.	None	None	15.70	8.51	None	None	5.00
National Steel Corp.	None	None	12.03	9.17	None	None	4.00
Inland Steel Co.	None	None	6.10	3.18	None	None	2.50
American Rolling Mill Co.	899,709	1,227,936	7.44	5.34	4.50	4.50	2.00
Wheeling Steel Corp.	1,815,830	1,815,830	15.15	6.25	5.00	5.00	1.75
Crucible Steel Co. of America	1,567,980	1,578,105	1.12	2.36*	5.00	5.00	None
Colorado Fuel & Iron Corp.§§	502,830	303,375	3.40	0.56*	1.00	0.60⅓	0.85
Pittsburgh Steel Co.	863,994	863,988	6.20	1.61*	6.87½*†	5.50*†	None
Lukens Steel Co.	None	None	8.92	0.00	None	None	1.40
Granite City Steel Co.*#	None	None	5.08	1.26*	None	None	1.00
Sharon Steel Corp.	None	149,150†*	10.89	4.39*§	None	2.50†*	2.00
Alan Wood Steel Co.	502,768	502,768	7.26	1.42	17.00	3.50	None
Midvale Co.	None	None	1.98*	3.10*	None	None	2.00
Allegheny Ludlum Steel Corp.	None	None	4.66	5.12	None	None	2.00
Continental Steel Corp.	None	None	2.59	1.89	None	None	1.50
Laclede Steel Co.	None	None	6.93	3.27	None	None	2.50‡
Keystone Steel & Wire Co.	None	None	7.48	4.46	None	None	3.05
Follansbee Steel Corp.†§	None	None	8.22	4.57	None	None	2.50
A. M. Byers Co.‡*	380,737	382,967	4.93	0.88*	7.00	7.00	0.50
Copperweld Steel Co.	81,852	82,965	2.85	0.69	2.50	2.50	0.80
Northwestern Steel & Wire Co.	6,545	5,250	2.36	3.74	8.73	7.00	1.35
Rotary Electric Steel Co.	None	None	5.41	2.89	None	None	0.25‡
Carpenter Steel Co.§§	None	None	6.38	4.53	None	None	3.00
Portsmouth Steel Corp.#†	None	.....	3.03	....	None	....	0.75
Total (or average)	$41,539,829	$42,011,322	$7.46	$5.03	....	....	....

NA= Not available.
*Deficit.
†To help cover abnormal replacement cost, U. S. Steel includes $26,390,000; Republic, $4,000,000; National, $3,500,000.
‡Dividends declared.
#Excludes deposit and offsetting liability of $35,000,000 under escrow agreement against payment to be made on or before June 19, 1948, for government properties.
§After 3-for-1 split.
**Dividends paid per share on prior preference stock were $6 in 1947 and $6 in 1946.
††Less $4,000,000 for increased construction and replacement costs, leaving $22,299,923 for transfer to earned surplus.
‡‡Ingot capacity of 1,960,000 net tons reduced 616,000 tons by sale of Portsmouth, O., plant July 1, 1946. Therefore, 1947 average ingot capacity of 1,652,000 is used in calculations.
##Claim for refund.
§§Fiscal year ended June 30.
*†Payment on prior preferred; payment on class A preferred 62½c in 1947, none in 1946; no payments either year on class B preferred.
*‡Net credit after adjustment of all taxes and refunds.

Financial Analysis of the

In making interpretations from this analysis, the following should be kept in mind: Carry-back provisions

Official Returns from Twenty-Eight Producers, Repres

Preferred Stock Valuation	Funded Debt		Surplus		Total Capitalization	
1946	1947	1946	1947	1946	1947	1946
$360,281,100	$77,229,313	$81,197,155	$497,735,179	$441,548,781	$1,587,989,492	$1,535,770,936
93,388,700	123,814,000	125,814,000	188,459,762	162,040,766	689,236,892	664,817,896
28,214,300	77,175,270	60,045,000	134,591,348	116,508,027	370,290,059	335,076,468
29,356,800	60,094,664	28,154,412	102,361,267	80,527,906	288,320,131	234,546,518
None	30,000,000	30,000,000	78,137,984	64,213,101	213,226,037	199,301,154
None	40,000,000	40,000,000	144,066,831	126,148,236	239,837,256	221,914,286
None	54,000,000	57,000,000	75,502,744	65,162,473	192,002,744	184,662,473
19,993,000	37,000,000	38,500,000	107,094,839	89,473,383	196,500,603	180,379,536
36,316,600	42,850,000	23,500,000	35,774,867	28,142,265	143,419,417	116,436,815
31,368,200	24,505,000	25,000,000	22,807,983	25,336,193	89,762,980	92,810,142
10,056,635	9,750,000	9,500,000	34,874,261	32,009,281	60,314,493	57,200,791
16,438,220	5,205,000	6,988,000	21,859,669	18,321,499	48,365,059	46,609,909
None	None	600,000	12,733,059	10,553,662	15,912,819	14,333,422
None	4,185,000	3,000,000	5,822,683	4,263,271	18,491,504	15,747,092
None	4,000,000	4,500,000	23,761,861	18,274,324	33,994,671	29,007,134
7,182,433	None	None	5,637,679	4,903,241	17,209,001	16,474,563
None	None	None	9,874,500	9,264,660	20,449,121	19,839,281
None	None	None	31,683,177	28,242,396	39,738,371	36,294,183
None	None	None	6,240,353	5,327,460	13,259,323	12,346,723
None	2,437,500	2,500,000	3,147,843	2,234,433	9,710,343	8,859,433
None	2,000,000	None	8,476,499	10,454,962	13,080,666	13,611,762
None	None	1,838,400	8,430,408	5,391,593	11,849,919	9,900,633
5,439,100	None	None	10,397,811	9,349,064	18,483,261	17,434,514
1,658,500	3,125,000	2,650,000	7,461,715	6,479,237	14,784,035	13,362,057
75,000	None	None	752,169	3,540,652	4,676,866	4,433,477
None	731,654	1,027,808	1,867,287	1,201,684	4,269,191	3,891,742
None	None	None	11,203,246	9,698,527	13,003,246	11,498,527
.....	None	.....	15,261,216	.....	16,412,742	.....
$639,768,588	$598,102,401	$541,814,775	$1,590,757,024	$1,378,611,077	$4,368,177,500	$4,096,561,467

Dividends Paid Per Share on Common	Average Number Employed		Total Payrolls		Rated Ingot Capacity Net Tons		Ingot Production Net Tons	
1946	1947	1946	1947	1946	1947	1946	1947	1946
$4.00	286,316	266,835	$890,112,230	$694,258,238	31,200,000	29,500,000	28,600,000	21,300,000
6.00	134,603	145,461	416,503,244	389,635,861	12,900,000	12,900,000	12,806,940	10,012,490
1.00	67,382	60,136	219,701,447	160,358,889	8,600,000	8,600,000	7,987,170	6,260,047
2.00	41,583	39,152	132,968,136	103,928,270	4,741,500	4,741,500	4,520,387	3,806,839
3.00	25,813	24,593	81,310,917	64,293,626	4,002,000	4,002,000	3,959,343	3,242,135
3.25	26,728	25,006	95,113,863	75,190,951	3,900,000	3,900,000	NA	NA
1.83⅓	22,110	20,374	76,985,753	59,528,916	3,400,000	3,400,000	3,299,528	2,811,003
1.25	28,844	27,138	92,787,905	74,896,811	3,367,000	3,276,000	3,078,487	2,738,009
1.50	14,237	14,928	49,173,316	44,725,781	1,409,000	1,344,000	1,285,832	1,264,414
None	15,804	16,403	50,333,000	43,400,000	1,250,133	1,273,350	NA	NA
0.45	14,666	12,837	40,552,156	27,500,312	1,448,640	1,392,420	1,369,460	1,072,242
None	9,734	9,100	33,159,971	24,850,918	1,072,000	1,072,000	1,006,887	838,219
None	5,067	4,687	16,742,944	12,198,836	624,000	624,000	637,347	497,621
0.05	2,341	1,356	6,822,294	3,182,215	500,000	403,200	440,398	155,786
1.30	9,448	7,765	28,488,985	17,985,087	1,672,000	1,500,000	1,222,887	874,190
None	3,169	3,018	9,771,106	7,728,975	550,000	550,000	449,945	348,378
2.00	2,556	3,052	8,914,954	9,619,678	NA	NA	NA	NA
2.00	12,531	12,639	39,463,404	35,764,589	496,360	460,360	411,095	363,797
0.80	2,648	3,260	8,717,777	8,566,785	364,000	364,000	316,644	293,527
1.50‡	2,240	2,136	6,659,711	5,506,979	326,025	326,025	288,038	275,002
2.85	2,128	2,035	8,368,648	6,790,294	302,400	302,400	288,561	285,148
0.50	2,200	2,299	7,675,886	5,076,512	141,120	141,120	NA	NA
None	2,800	NA	8,802,407	5,678,817	NA	NA	NA	NA
0.80	1,908#*	1,631#*	6,900,123#*	4,412,827#*	420,000#*	321,360#*	450,614#*	182,030#*
1.00	1,574	1,440	5,344,211	4,196,564	321,000	321,000	273,947	225,019
None	958	941	3,893,600	3,035,063	255,000	255,000	201,556	116,825
2.50	2,863	2,853	9,864,314	8,476,437	74,880	74,880	51,329	51,068
....	3,900	.....	NA	.....	660,000	.....	667,011	.....
....	742,251	711,075	$2,355,132,302	$1,900,788,231	83,337,058	81,044,615	72,946,395	57,013,779

*#Company's operations were affected by 7-months' strike in 1946.

*§Does not include addition of $600,000 from reserve for contingencies.

+*Dividends paid on preferred stock represent requirements for one-half year. Preferred stock redeemed July 1, 1946.

+‡Based on average yearly capacity of 1,596,000 tons in 1947, and 1,480,200 in 1946.

+#Loss before applying credit of $680,000 for 1947 and $3,234,658 for 1946 for estimated carry-back refunds of federal income taxes.

+§Comparison of company's earnings with steel ingot capacity or output would be misleading as company buys all hot strip used in manufacture of cold-reduced coils, sheet, strip and seamless roofing.

‡*Fiscal year ended Sept. 30.

‡†Reflects stock split of 4 for 1 in June, 1947.

‡#Includes accelerated amortization of $110,545 for prior years.

‡§Comparisons would be misleading inasmuch as company operates both a steel plant and copper-covered steel wire and cable plant.

#*Applicable to company's steel plant only.

e Steel Industry for 1947

ons on federal taxes, renegotiation, reductions in reserve for contingencies, and accelerated depreciation.

resenting 92.06 Per Cent of Steelmaking Capacity

Capitalization Per Ton Ingot Capacity 1947	1946	Provision for Depreciation and Depletion 1947	1946	Total Income Before Dividends and Interest on Bonds 1947	1946	Per Cent Total Income of Capitalization 1947	1946	1947
$50.90	$52.06	$114,045,483†	$68,739,174	$129,605,877	$93,399,610	8.16	6.08	$2,122,78
53.43	51.54	23,090,913	20,741,827	55,013,594	44,285,989	7.98	6.66	1,032,33
43.06	37.65	18,901,535†	11,632,704	33,308,777	17,796,737	9.00	5.31	645,32
60.81	49.47	13,193,133	10,293,623	24,663,822	11,756,801	8.55	5.01	350,13
53.28	49.80	10,499,976	9,192,780	27,124,923	15,130,530	12.72	7.59	308,57
61.50	56.90	12,853,292†	8,192,976	28,095,931	21,718,795	11.71	9.79	328,95
56.47	54.31	7,932,076	6,633,572	31,298,350	17,608,287	16.30	9.53	315,03
58.36	55.06	6,951,619	5,000,811	26,077,023	19,380,678	13.27	10.74	311,68
101.79	70.48‡‡	4,877,727	5,355,005	11,216,720	6,195,109	7.82	5.32	131,72
71.80	72.89	2,159,519	2,014,377	2,839,198	1,040,820	3.16	1.12	110,50
41.64	41.08	2,665,327	2,763,543	4,622,538	49,229*	7.66	0.08*	94,74
45.12	43.48	1,813,965	1,583,126	4,393,635	441,320	9.08	0.95	85,87
25.50	22.97	999,558	836,832	2,835,702	651	17.82	0.00	52,77
36.98	39.06	887,611	511,275	2,926,094	424,940*	15.82	2.70*	25,86
20.33	19.34	1,470,495	1,197,360	6,829,010	2,999,615*§	20.09	10.34*§	89,57
31.29	29.95	930,587	681,269	1,955,446	786,223	11.36	4.77	35,97
NA	NA	520,000	460,000	1,186,727†#	1,861,284†#	5.80*	9.38*	14,82
80.06	78.84	1,635,919	1,374,548	6,002,657	6,599,346	15.11	18.18	106,78
36.43	33.92	490,855	499,452	1,296,874	946,119	9.78	7.66	27,08
29.78	27.17	481,549	421,383	1,504,035	710,429	15.49	8.02	26,28
43.26	45.01	388,329	344,859	4,721,453	3,379,018	36.09	24.82	31,57
83.97	70.16	396,839	369,804	2,877,550	1,261,999	24.28	12.75	28,71
NA	NA	833,326	643,651	1,685,093	149,530	9.12	0.86	25,01
‡§	‡§	637,961	292,816	1,624,309	496,027	10.99	3.71	53,30
14.57	13.81	180,670	189,458	1,932,747	616,638	41.33	13.91	21,18
16.74	15.26	140,472	108,792	951,845	531,487	22.30	13.65	16,50
173.65	153.56	285,872	402,910‡#	2,298,071	1,629,206	17.67	14.17	24,17
24.87	....	805,025	.....	3,944,969	.....	24.04	....	49,77
$51.95	**$50.09**	$229,264,608	$160,477,927	$416,514,547	$266,525,511	9.54	6.51	$6,417,31

Steel Operating Rate Net Tons 1947	1946	Net Income Per Ton Ingots Produced 1947	1946	Net Income Per Ton Ingot Capacity 1947	1946	Federal Income Taxes 1947	1946	Total Assets 1947	1946	
96.70	72.90	$4.44	$4.16	$4.07	$3.00	$91,000,000	$32,000,000	$2,162,612,907	$2,003,517,407#	$9
99.28	77.61	3.99	4.17	3.96	3.24	31,000,000	15,500,000	948,757,769	891,366,922	4
92.87	70.34	3.88	2.56	3.61	1.80	23,250,000	9,000,000	455,060,571	405,398,232	1
95.34	80.29	4.95	2.82	4.72	2.27	13,384,000	4,700,000	341,328,755	280,768,397	1
98.93	81.01	6.64	4.40	6.57	3.56	16,635,000	9,275,000	260,331,477	234,642,650	1
NA	NA	NA	NA	6.88	5.25	19,270,000	13,875,000	292,361,297	281,199,450	1
97.04	82.68	9.06	5.53	8.79	4.58	18,485,000	8,998,150	243,724,217	214,795,853	1
91.43	83.58	8.12	6.78	7.43	5.66	16,464,876	11,449,833	248,791,869	227,149,526	1
91.26	76.54‡‡	8.12	4.25	7.41	3.25‡‡	8,290,000	2,077,667	158,486,970	128,809,454	
NA	NA	NA	NA	1.65	0.41	1,084,466	1,505,024##	109,499,530	107,999,288	
94.53	77.01	3.16	0.31*	2.99	0.24*	3,515,100	400,000	83,391,168	73,406,208	
93.93	78.19	3.99	0.06	3.75	0.04	3,175,000	100,000	64,608,277	55,341,718	
102.14	79.75	4.45	0.00	4.54	0.00	1,844,000	290,898*‡	23,990,231	18,869,145	
88.08	38.64	4.41	3.09*	3.88	1.19*	880,000	None	24,260,095	19,992,856	
76.62†‡	59.06†‡	5.50	3.27	4.02	1.91	4,225,000	1,675,000	48,580,231	39,689,672	
81.81	63.34	4.35	2.26	3.56	1.43	1,238,000	447,000	21,981,691	19,954,848	
NA	NA	NA	NA	NA	NA	None	None	23,486,462	24,875,812	
82.82	79.02	14.60	18.14	12.09	14.34	4,068,068	5,031,152	52,491,502	51,413,221	
86.99	80.63	4.10	3.22	3.56	2.60	890,000	900,000	17,878,538	15,976,344	
88.35	84.35	4.96	2.46	4.38	2.07	955,000	474,500	12,750,515	11,250,784	
95.42	94.29	16.19	11.85	15.45	11.17	2,458,436	2,704,895	16,899,490	14,921,805	
NA	NA	NA	NA	NA	NA	1,800,000	716,000	15,782,564	12,293,051	
NA	NA	NA	NA	NA	NA	1,200,000	600,000##	23,022,766	19,223,284	
‡* 107.29#*	56.64#*	‡§	‡§	‡§	‡§	1,148,000	287,000	21,973,658	19,600,912	
85.34	70.10	7.06	2.74	6.02	1.92	1,319,000	553,009	7,075,743	6,084,924	
79.04	45.81	4.48	4.11	3.54	1.88	544,000	300,000	5,855,109	5,026,769	
68.55	68.20	44.77	31.90	30.69	21.76	1,543,040	2,086,223	17,167,735	16,275,499	
101.06	....	5.91	....	5.98	....	2,358,000	.....	23,147,057	.....	
93.47	**75.29**	**$5.01**	**$4.01**	**$4.76**	**$3.09**	$269,665,986	$120,154,507	$5,702,151,137	$5,199,844,031	$2,6

#‡Company began operations in last half of 1946. Therefore, no figures are shown for that year, and to avoid distortion the 1947 figures are not included in column totals.

"Net Income Before Dividends" columns and totals do not take into consideration requirements (not actual payments) for preferred dividends. In computing earnings per common share these totals, adjusted for preferred dividend requirements, are used. In arriving at earnings per common share for individual companies the same method is followed.

Boldface type is used under those columns in which figures from all the first 27 companies were not available.

PER CENT EARNED ON CAPITALIZATION

1928	6.55	1934	0.36	1941	
1929	9.88	1935	2.09	1942	
1930	4.54	1936	4.40	1943	
1931	0.40	1937	6.07	1944	
1932	*2.85	1938	0.59	1945	
1933	*0.90	1939	4.27	1946	
*Loss		1940	7.57	1947	

Net Sales 1947	Net Sales 1946	Net Profit Margin Per Cent 1947	Net Profit Margin Per Cent 1946	Net Income Before Dividends 1947	Net Income Before Dividends 1946	
$2,122,786,243	$1,496,064,326	5.99	5.92	$127,098,148	$88,622,475	United States Steel Corp.
1,032,337,825	787,720,668	4.95	5.30	51,088,375	41,731,931	Bethlehem Steel Corp.
645,328,877	412,755,542	4.81	3.88	31,018,410	16,033,469	Republic Steel Corp.
350,132,366	246,297,831	6.39	4.36	22,383,591	10,745,560	Jones & Laughlin Steel Corp.
308,571,405	218,495,688	8.52	6.52	26,299,923††	14,254,905	Youngstown Sheet & Tube Co.
328,957,189	239,764,320	8.16	8.53	26,838,788	20,461,651	National Steel Corp.
315,031,042	217,739,493	9.49	7.14	29,888,558	15,556,897	Inland Steel Co.
311,685,322	231,930,811	8.02	8.00	25,002,211	18,552,491	American Rolling Mill Co.
131,721,128	110,397,692	7.93	4.87	10,445,161	5,372,910	Wheeling Steel Corp.
110,503,836	88,417,091	1.87	0.60	2,064,887	527,417	Crucible Steel Co. of America
94,740,442	58,118,237	4.57	0.57*	4,329,991	334,751*	§§Colorado Fuel & Iron Corp.
85,873,538	54,555,294	4.68	0.09	4,019,638	46,635	Pittsburgh Steel Co.
52,773,066	30,289,067	5.37	0.00	2,835,702	651	Lukens Steel Co.
25,869,719	8,567,977	7.51	5.62*	1,941,899	481,696*	*#Granite City Steel Co.
89,575,212	55,021,144	7.50	5.19*§	6,722,019	2,857,856*§	Sharon Steel Corp.
35,971,661	25,263,991	5.44	3.11	1,955,446	786,223	Alan Wood Steel Co.
14,829,373	14,665,297	8.00*	12.69*	1,186,727†#	1,861,284†#	Midvale Co.
106,783,183	95,277,573	5.62	6.93	6,002,657	6,599,346	Allegheny Ludlum Steel Corp.
27,086,139	24,330,784	4.79	3.89	1,296,874	946,119	Continental Steel Corp.
26,283,120	17,140,184	5.44	3.94	1,429,035	675,304	Laclede Steel Co.
31,573,658	23,610,560	14.80	14.31	4,672,934	3,379,018	Keystone Steel & Wire Co.
28,715,064	17,419,825	9.90	7.01	2,841,568	1,220,635	†§Follansbee Steel Corp.
25,018,017	13,899,650	6.73	1.07	1,685,093	149,530	‡*A. M. Byers Co.
53,303,245	25,388,894	2.90	1.73	1,546,711	439,777	Copperweld Steel Co.
21,185,519	12,753,240	9.12	4.84	1,932,747	616,638	Northwestern Steel & Wire Co.
16,500,149	10,114,334	5.48	4.75	903,360	480,438	Rotary Electric Steel Co.
24,174,993	22,211,411	9.51	7.33	2,298,071	1,629,206	§§Carpenter Steel Co.
49,775,398	.....	7.92	....	3,944,969	.....	#†Portsmouth Steel Corp.
$6,417,311,331	$4,558,210,924	6.19	5.46	$397,355,070	$249,009,351	Total (or average)

Current Assets 1947	Current Assets 1946	Current Liabilities 1947	Current Liabilities 1946	Ratio of Current Assets to Current Liabilities 1947	Ratio of Current Assets to Current Liabilities 1946	
17,407#	$964,993,485	$954,639,288	$416,345,387	$325,560,350	2.32—1	2.93—1	United States Steel Corp.
66,922	486,073,751	482,245,860	195,958,781	150,365,104	2.48—1	3.21—1	Bethlehem Steel Corp.
98,232	196,021,638	183,905,259	71,504,577	56,929,575	2.74—1	3.23—1	Republic Steel Corp.
68,397	137,369,641	122,188,413	48,533,258	39,200,442	2.83—1	3.12—1	Jones & Laughlin Steel Corp
12,650	150,233,464	132,822,278	30,710,207	23,006,476	4.89—1	5.77—1	Youngstown Sheet & Tube Co.
99,450	106,900,893	117,500,096	33,529,718	41,080,816	3.19—1	2.86—1	National Steel Corp.
95,853	137,089,385	117,833,865	32,185,473	18,971,747	4.26—1	6.21—1	Inland Steel Co.
19,526	122,087,231	122,732,526	45,265,366	40,154,736	2.70—1	3.06—1	American Rolling Mill Co.
99,454	64,640,519	59,050,739	11,068,413	10,823,524	5.84—1	5.46—1	Wheeling Steel Corp.
99,288	50,801,960	46,547,372	18,329,538	12,399,346	2.77—1	3.75—1	Crucible Steel Co. of America
96,208	35,940,352	30,244,316	18,722,527	11,954,106	1.92—1	2.53—1	§§Colorado Fuel & Iron Corp.
41,718	34,132,401	28,541,976	13,381,936	7,820,458	2.55—1	3.65—1	Pittsburgh Steel Co.
89,145	14,049,684	10,891,190	6,724,841	3,478,408	2.09—1	3.13—1	Lukens Steel Co.
02,856	10,578,760	8,458,736	5,263,820	3,820,871	2.01—1	2.21—1	*#Granite City Steel Co.
39,672	33,185,462	25,721,606	14,585,560	10,317,538	2.28—1	2.49—1	Sharon Steel Corp.
14,848	10,375,200	10,032,205	4,267,496	2,881,182	2.43—1	3.48—1	Alan Wood Steel Co.
15,812	16,902,710	18,566,399	1,683,455	1,335,126	10.04—1	13.90—1	Midvale Co.
33,221	32,079,557	35,982,038	11,233,298	13,929,254	2.86—1	2.58—1	Allegheny Ludlum Steel Corp.
66,344	9,669,690	9,986,222	3,360,176	2,203,421	2.88—1	4.53—1	Continental Steel Corp.
10,784	7,069,230	6,707,554	2,300,171	1,696,351	3.07—1	3.95—1	Laclede Steel Co.
11,805	7,573,709	7,008,956	3,725,369	1,131,397	2.03—1	6.19—1	Keystone Steel & Wire Co.
33,051	10,056,195	6,864,245	3,804,403	2,271,675	2.64—1	3.02—1	†§Follansbee Steel Corp.
33,284	10,084,663	6,981,181	4,245,427	1,664,128	2.38—1	4.19—1	‡*A. M. Byers Co.
10,912	15,670,169	13,729,819	6,500,153	5,639,993	2.41—1	2.43—1	Copperweld Steel Co.
44,924	3,466,731	2,621,162	1,898,877	1,193,185	1.83—1	2.20—1	Northwestern Steel & Wire Co.
66,769	4,020,206	3,328,060	1,385,917	1,122,269	2.90—1	2.97—1	Rotary Electric Steel Co.
55,499	12,269,136	12,564,876	3,487,095	4,073,495	3.52—1	3.08—1	§§Carpenter Steel Co.
....	15,510,335	.....	6,627,794	.....	2.34—1	.....	#†Portsmouth Steel Corp.
44,031	$2,683,335,822	$2,577,696,237	$1,010,001,239	$795,024,973	2.66—1	3.24—1	Total (or average)

ON

1941	7.87
1942	5.69
1943	5.22
1944	5.02
1945	5.24
1946	6.51
1947	9.54

e Steel Industry for 194

ons on federal taxes, renegotiation, reductions in reserve for contingencies, and accelerated depreciation.

resenting 92.06 Per Cent of Steelmaking Capacity

Capitalization Per Ton Ingot Capacity 1947	1946	Provision for Depreciation and Depletion 1947	1946	Total Income Before Dividends and Interest on Bonds 1947	1946	Per Ce of 1947
$50.90	$52.06	$114,045,483†	$68,739,174	$129,605,877	$93,399,610	8.16
53.43	51.54	23,090,913	20,741,827	55,013,594	44,285,989	7.98
43.06	37.65	18,901,535†	11,632,704	33,308,777	17,796,737	9.00
60.81	49.47	13,193,133	10,293,623	24,663,822	11,756,801	8.55
53.28	49.80	10,499,976	9,192,780	27,124,923	15,130,530	12.72
61.50	56.90	12,853,292†	8,192,976	28,095,931	21,718,795	11.71
56.47	54.31	7,932,076	6,633,572	31,298,350	17,608,287	16.30
58.36	55.06	6,951,619	5,000,811	26,077,023	19,380,678	13.27
101.79	70.48‡‡	4,877,727	5,355,005	11,216,720	6,195,109	7.82
71.80	72.89	2,159,519	2,014,377	2,839,198	1,040,820	3.16
41.64	41.08	2,665,327	2,763,543	4,622,538	49,229*	7.66
45.12	43.48	1,813,965	1,583,126	4,393,635	441,320	9.08
25.50	22.97	999,558	836,832	2,835,702	651	17.82
36.98	39.06	887,611	511,275	2,926,094	424,940*	15.82
20.33	19.34	1,470,495	1,197,360	6,829,010	2,999,615*§	20.09
31.29	29.95	930,587	681,269	1,955,446	786,223	11.36
NA	NA	520,000	460,000	1,186,727†#	1,861,284†#	5.80
80.06	78.84	1,635,919	1,374,548	6,002,657	6,599,346	15.11
36.43	33.92	490,855	499,452	1,296,874	946,119	9.78
29.78	27.17	481,549	421,383	1,504,035	710,429	15.49
43.26	45.01	388,329	344,859	4,721,453	3,379,018	36.09
83.97	70.16	396,839	369,804	2,877,550	1,261,999	24.28
NA	NA	833,326	643,651	1,685,093	149,530	9.12
‡§	‡§	637,961	292,816	1,624,309	496,027	10.99
14.57	13.81	180,670	189,458	1,932,747	616,638	41.33
16.74	15.26	140,472	108,792	951,845	531,487	22.30
173.65	153.56	285,872	402,910‡#	2,298,071	1,629,206	17.67
24.87	....	805,025	.....	3,944,969	.....	24.04
$51.95	**$50.09**	$229,264,608	$160,477,927	$416,514,547	$266,525,511	9.5

Steel Operating Rate Net Tons 1947	1946	Net Income Per Ton Ingots Produced 1947	1946	Net Income Per Ton Ingot Capacity 1947	1946	Federal Income Taxes 1947	1946	1947
96.70	72.90	$4.44	$4.16	$4.07	$3.00	$91,000,000	$32,000,000	$2,162,612,
99.28	77.61	3.99	4.17	3.96	3.24	31,000,000	15,500,000	948,757,
92.87	70.34	3.88	2.56	3.61	1.80	23,250,000	9,000,000	455,060,
95.34	80.29	4.95	2.82	4.72	2.27	13,384,000	4,700,000	341,328,
98.93	81.01	6.64	4.40	6.57	3.56	16,635,000	9,275,000	260,331,
NA	NA	NA	NA	6.88	5.25	19,270,000	13,875,000	292,361,
97.04	82.68	9.06	5.53	8.79	4.58	18,485,000	8,998,150	243,724,
91.43	83.58	8.12	6.78	7.43	5.66	16,464,876	11,449,833	248,791,
91.26	76.54‡‡	8.12	4.25	7.41	3.25‡‡	8,290,000	2,077,667	158,486,
NA	NA	NA	NA	1.65	0.41	1,084,466	1,505,024##	109,499,
94.53	77.01	3.16	0.31*	2.99	0.24*	3,515,100	400,000	83,391,
93.93	78.19	3.99	0.06	3.75	0.04	3,175,000	100,000	64,608,
102.14	79.75	4.45	0.00	4.54	0.00	1,844,000	290,898*‡	23,990,
88.08	38.64	4.41	3.09*	3.88	1.19*	880,000	None	24,260,
76.62†‡	59.06†‡	5.50	3.27	4.02	1.91	4,225,000	1,675,000	48,580,
81.81	63.34	4.35	2.26	3.56	1.43	1,238,000	447,000	21,981,
NA	NA	NA	NA	NA	NA	None	None	23,486,
82.82	79.02	14.60	18.14	12.09	14.34	4,068,068	5,031,152	52,491,
86.99	80.63	4.10	3.22	3.56	2.60	890,000	900,000	17,878,
88.35	84.35	4.96	2.46	4.38	2.07	955,000	474,500	12,750,
95.42	94.29	16.19	11.85	15.45	11.17	2,458,436	2,704,895	16,899,
NA	NA	NA	NA	NA	NA	1,800,000	716,000	15,782
NA	NA	NA	NA	NA	NA	1,200,000	600,000##	23,022
107.29#*	56.64#*	‡§	‡§	‡§	‡§	1,148,000	287,000	21,973
85.34	70.10	7.06	2.74	6.02	1.92	1,319,000	553,009	7,075
79.04	45.81	4.48	4.11	3.54	1.88	544,000	300,000	5,855
68.55	68.20	44.77	31.90	30.69	21.76	1,543,040	2,086,223	17,167
101.06	....	5.91	....	5.98	....	2,358,000	.....	23,147
93.47	**75.29**	**$5.01**	**$4.01**	**$4.76**	**$3.09**	$269,665,986	$120,154,507	$5,702,151

‡*

#†Company began operations in last half of 1946. Therefore, no figures are shown for that year, and to avoid distortion the 1947 figures are not included in column totals.

"Net Income Before Dividends" columns and totals do not take into consideration requirements (not actual payments) for preferred dividends. In computing earnings per common share these totals, adjusted for preferred dividend requirements, are used. In arriving at earnings per common share for individual companies the same method is followed.

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PER CENT EARNED O

1928	6.55	1934	
1929	9.88	1935	
1930	4.54	1936	
1931	0.40	1937	
1932	*2.85	1938	
1933	*0.90	1939	
*Loss		1940	

Freight Boost Lifts Users' Steel Costs

THIRD INTERIM increase in freight rates, ranging from 20 per cent to 30 per cent and superseding the two previous interim increases, will boost the cost of steel to the ultimate consumer. The action also will tend to shrink further the territory which mills are willing to serve.

Most of the increase will be added to the delivered price of steel products, although some will be absorbed by the mills in order to maintain their competitive position in selected territories. In the postwar period, mills have been increasingly reluctant to absorb large freight charges. This is reflected in the fact that mills have eliminated many basing points in their price schedules while retaining the right to meet competitors' prices, or not to do so, at any basing points.

The increase in freight rates also boosts steelmaking costs, especially in bringing in certain raw materials. With the exception of a few adjustments, base prices have not been adjusted to recover the previous interim freight rate increases. Advances in rail freight charges since last October are estimated to have increased steel production costs by more than $2 a ton.

The order issued by the Interstate Commerce Commission is effective upon 10 days' notice by the railroads that they are filing new tariffs. It incorporates the 20 per cent previous increases and adds an average of 4 to 5 per cent more.

The basic freight rates are to be boosted as follows: Within the eastern territory, 30 per cent above last September rates; within southern territory, 25 per cent above last September rates; from, to and within Zone 1 of the western trunk line territory (covering an area immediately west of Chicago), 25 per cent; within western territory, other than Zone 1, 20 per cent; interterritorially between southern territory and western territory and also between these two territories and eastern territory, 25 per cent. The new increases lift rates within the East by 10 per cent above those previously in effect, within the South by 5 per cent, and within Zone 1 of western territory by 5 per cent.

Rates on lignite coal may be increased 20 cents per net ton, or 22 cents per gross ton.

Rates on anthracite and bituminous coal and coke may be increased as follows: Rates (exclusive of the interim increases) up to and including $1.15 per net ton, 20 cents; over $1.15 and not over $2.50 per net ton, 25 cents; over $2.50 per net ton, 30 cents; rates (exclusive of the interim increases) up to and including $1.29 per gross ton, 22 cents; over $1.29 but not over $2.80 per gross ton, 28 cents; and over $2.80 per gross ton, 34 cents. The rates on coal from Illinois mines to East St. Louis and Alton, Ill., for movement beyond by barge to points on the upper Mississippi river, may be increased 12 cents per net ton.

Maximum increase in rates on iron ore (not ground or hydrated) and iron sinter is 10 cents per net ton or 11 cents per gross ton to the upper lake ports, and 25 cents per net ton or 28 cents per gross ton elsewhere.

Maximum increase in rates on aluminum, copper, lead and zinc ore and concentrates; and on underground manganese ore and chrome ore is 30 cents per net ton or 34 cents per gross ton. Maximum increase on aluminum, copper, lead and zinc metal or alloys and articles made of such metals or alloys is 14 cents per 100 pounds or $2.80 per ton.

Maximum increase on iron and steel items is 14 cents per 100 pounds, or $2.80 per ton.

Charges for handling iron ore at both upper and lower lake ports may be increased 18 per cent.

Rates and charges for the switching of coal, coke and iron ore within eastern territory, where such charges are presently absorbed by line-haul carriers, may be increased 18 per cent, provided the absorptions by line-haul carriers are likewise increased by that percentage.

The railroads in their original petition of July 3, 1947, and the supplemental petitions of Sept. 5 and Dec. 3 had asked for a total increase of 41 per cent in the eastern territory and 31 per cent in the West and South. The requested increases averaged 29.2 per cent.

In granting the latest increase, the ICC said higher rates were required because of the freight business which has been lost because of work stoppages in the coal mining and other major industries, and by severe winter conditions in the early months of the year.

Facts for Industry . . .

(As reported by government agencies)

Steel Forgings — Shipments of commercial steel forgings totaled 116,676 short tons in February, compared with 118,534 in January. Of the latest month's total 86,592 tons were of drop and upset forgings and 30,084 of press and open hammer. Order backlogs at the end of February were 630,860 short tons, compared with 618,155 short tons in January. *Census Bureau, Commerce Dept.*

Steel Castings — Steel castings shipments rose slightly to 142,434 short tons in February from 141,068 tons in January. Shipments for sale to the trade accounted for 107,762 tons, or 76 per cent of the total. Of this tonnage, 34,800 were of railroad specialties. *Census Bureau, Commerce Dept.*

Gray Iron Castings—With lower tonnages of miscellaneous castings, molds for steel ingots and cast iron soil pipe and fittings shipped in February than in January, total shipments of gray iron castings were off slightly to 1,024,450 short tons from 1,064,335 in January. Of February's total 56 per cent, or 571,406 tons, was shipped for sale to the trade. Comprising February shipments were: Miscellaneous castings 671,195 short tons; molds for heavy steel ingots 148,087 tons; chilled iron railroad wheels 64,647 tons; cast iron pressure pipe and fittings 92,996 tons; and cast iron soil pipe and fittings 47,525 tons. *Census Bureau, Commerce Dept.*

Cast Iron Boilers, Radiators, Convectors — Production of cast iron boilers in February totaled 29,483,000 lb and of cast iron radiators and convectors 5,138,000 sq ft. This compares with January production of 29,043,000 lb of boilers and 5,376,000 sq ft of radiators. Shipments of boilers in the latest month amounted to 18,660,000 lb, valued at $2,920,000, compared with January shipments of 22,018,000 lb, with value of $3,471,000. Radiation shipments were 5,010,000 sq ft, or $2,459,000, compared to 5,181,000 sq ft, or $2,532,000, in January. *Census Bureau, Commerce Dept.*

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Opposition to proposed change in method of fixing wage rates at Navy establishments based on fact dominant voice would be given labor in establishing policy

WHILE Navy brass hats are not saying so directly, their opposition to the proposal to change the method of fixing wage rates at Navy yards and shore establishments is based largely on the fact that it would give organized labor, for the first time in history, a dominant voice in running these establishments.

The Navy policy is that membership or nonmembership in a labor organization shall have no bearing on the individual's employment or tenure of hire. Under this policy there is no incentive for civilian employees to join labor unions. In fact, less than 20 per cent of the Navy's employees are members of organized employee groups.

Labor Proposal—The current proposal, one that has been agitated by the interested labor unions for a long time, is set forth in a bill introduced in the House as H. R. 5850 by Rep. Homer R. Jones (Rep., Wash.) and in the Senate as S. 2285 by Sen. Styles Bridges (Rep., N. H.). It provides that:

"The rates of wages of the employees in each Navy yard shall conform to those paid for comparable skill, experience and responsibility in private establishments in the general industrial area in which the yard is located, or in other industrial areas if comparable skill, experience and responsibility cannot be found in private establishments in such area."

For one thing, the bill would kill off the authority given the Navy last year to use time-study methods in setting pay rates—and Navy brass likes this power to reward men for work actually performed.

Selection Method Opposed—But the worst objection is to the provision that membership of the local wage boards that would set the rates at each Navy establishment would be chosen 50 per cent from officers of the yard, and 50 per cent from employee organizations affiliated with national or international labor organizations.

Such a provision could only lead to "eternal wrangling" at Navy yards, Undersecretary W. John Kenney told the Senate Post Office & Civil Service Committee which held a series of hearings at which most of the witnesses, as was to be expected from the fact that they were officers of interested labor unions, were strongly in support of the bill. He pointed out the impropriety of an "impartial" wage board composed 50 per cent of persons "whose sole interest and function it is to urge ever-higher wages."

The Navy, said Mr. Kenney, considers it "both unsound and unethical for any group to be empowered to act both as an advocate for the employees' claim and to sit as a judge on the sufficiency thereof." The actual operation of local boards, he said, "would take on the aspect of wage negotiations or collective bargaining for the employees involved." The wage boards, he said, would sit in almost constant session, with a resulting loss in efficiency at Navy yards due to the need for paying large numbers of employees for time spent in considering wage adjustments rather than for work performed."

Restrict Co-ordination — The proposed legislation, said Mr. Kenney, would restrict, perhaps completely eliminate, co-ordination of the Navy's wage policies with those of the Army and Air Force. It would "in my opinion inevitably lead to an attempt improperly to use naval establishment wage rates as a vehicle for affecting local or industry wage patterns."

Another bad feature of the bill, Mr. Kenney told the committee, is omission of the usual authorization to establish government wage rates at levels "as nearly as is consistent with the public interest." In dealing with union-dominated wage boards the Navy needs such authority to counter unreasonable demands. In fact it was failure to include such a provision in the original wage act of 1861 that made it necessary to revise that act in 1862. One of the valuable features of this provision, said Mr. Kenney, is that it enables the Navy to continue paying established wage rates in times of depression when wages in private industry often temporarily are lowered. "We realize that a proper wage plays a most important part in maintaining morale."

Advocates Retention—Mr. Kenney advocated retention in its existing form of the Wage Act of 1862 under which the Navy, all through the 86-year history of that act, has been able to handle its wage problems satisfactorily from an all-round point of view.

In the House the bill has been referred to the House Armed Services Committee which, before deciding what course of action to pursue, has asked the Navy for an analysis of the effects of the bill. In view of the strong Navy opposition there probably will be a disposition in the House committee to wait and see what the Senate does as a result of its hearings.

CANNED GUNS

The Army has been using a "can opener" in recent months to open some of its "canned" guns and other items to determine whether storage in metal containers has preserved them effectively. Spot checks have shown the guns to be in excellent condition and ready, almost without exception, for immediate use. Only slight specks of rust and corrosion were found after about two years' storage.

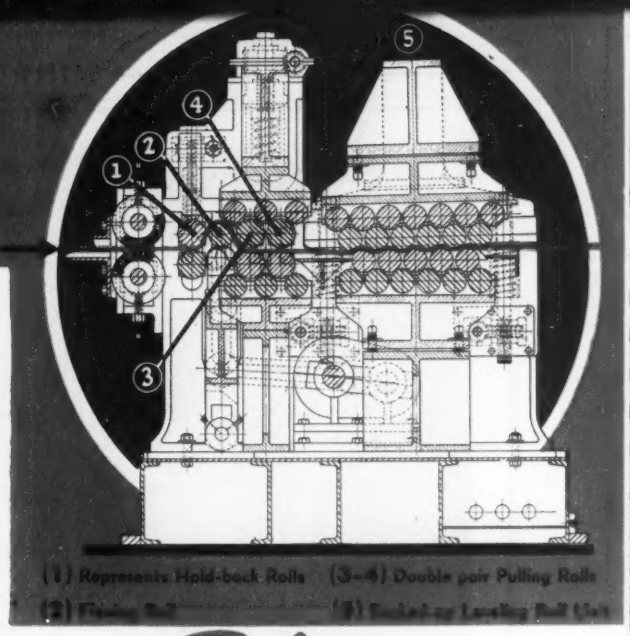
The Ordnance Department's inspections are the first of their kind to be reported by the Army although both the Navy and the Air Force have "canned" and "cocooned" ships, planes and other equipment.

Based on an idea originated more than 25 years ago at Rock Island Arsenal by a young Ordnance officer, the canning process was perfected and put to use after the past war for preservation of some of the tanks and weapons that were to be retained.

Army Procurement

As part of its program of simplifying and improving military procurement procedures, the Munitions Board had assigned to the Department of the Army the single procurement responsibility for motor vehicles for all the military services. In cases of special equipment, exceptions may be made by agreement between the De-

BUDD-McKAY



(1) Represents Hold-back Rolls (3–4) Double pair Pulling Rolls

(2) Flexing Roll (5) Backed-up Leveling Roll Unit

IN operation, a sheet is fed between the brush rolls, the hold-back rolls and into the bite of the pulling rolls which draw it into the machine. After the sheet is securely gripped by the pulling rolls, the flexing roll is automatically shifted from its idle position below the pass line into its upper, or working, position as indicated by (2). This causes the sheet to go into a full quarter turn around the exit side of the hold-back rolls (1), a reverse half-turn upward over the flexing roll (2), and another reverse quarter turn downward around the first top pulling roll (3).

The triple bending, or flexing, of the sheet as it passes in and out of the loop kneads the steel and imparts the desired amount of cold plasticity. A second set of pulling rolls (4) directs the sheet into the backed-up leveling rolls where it is flexed repeatedly and finally ejected a flat sheet.

The progressive advancement of the bend throughout the area of the sheet, followed by a pass through the staggered leveler rolls, permits the flexing to be carried much further beyond the elastic limit of the steel than is possible by any roller leveler, thus affording greater freedom from stretcher strains.

While conventional four-high roller leveling machines assist fabricators in securing a suitable texture in steel sheets, yet the mechanical work accomplished is not sufficient to make the sheet altogether immune from surface blemishes. The flexing action of the BUDD-McKAY PROCESSOR frees the grain structure so that, when the steel is drawn under dies to the desired contour, stretcher strains do not occur.

Sheets processed by the BUDD-McKAY PROCESSOR remain free from strains longer because of the extreme flexing and thorough roller leveling, but subsequent forming operations should follow soon after the processing if its full benefits are to be obtained, as a lapse of time causes the sheet to display a tendency to return to its initial condition.

Sheet PROCESSING MACHINE

WITH THE NEW BUDD-McKAY SHEET PROCESSING MACHINE it is possible to render sheets free of stretcher strains. Sheets processed on this patented processing machine have far superior stamping and drawing qualities, and retain these qualities much longer, than sheets processed by any other method.

BUDD-McKAY (PATENTED) PROCESSOR

The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

ASSOCIATED COMPANY

The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

URGES ANTI-COMMUNIST LEGISLATION: Rep. Donald L. Jackson (Rep., Calif.), left, eye-witness of the Bogota uprising, has called upon Congress to enact anti-Communist legislation to prevent a similar outbreak in this country. He is shown here chatting with Rep. Joe Martin (Rep., Mass.), speaker of the House. NEA photo

partment of the Army and the service requiring the special equipment.

Rust in the Antarctic

Steel loses its tendency to rust when subjected to low temperatures, according to Ensign C. W. Mallory, Civil Engineer Corps, United States Navy, who recently returned from a second visit to Little America in the Antarctic. Equipment purposely abandoned by the Byrd expedition in 1947 showed no sign of rust early in 1948. In addition to remaining bright, the equipment kept in the cold, dry atmosphere of the Antarctic "icebox" —where 28 degrees Fahr. is considered warm weather—was in perfect operating condition.

Dug out of a 10-foot snowdrift, a weasel (snow tractor) was started up on the fuel, lubrication and storage battery which had remained in it for a year. It was first preheated with hot blasts to remove 4 inches of ice which had accumulated on the instrument panel. A jeep which had been left in a canvas-covered shed, started up without preheating, as did two GMC diesel motor 25-30 kilowatt generators. Other equipment which was bright and in shape for immediate use was a gasoline engine D-6 tractor, a TD-9 International tractor, and battery-charging apparatus.

The slow rate of deterioration of equipment at Little America, said Ensign Mallory, is illustrated by a wind-driven generator which has been running since it was erected by members of the 1933-34 Byrd expedition.

European Co-operation Jobs

Applications for employment by the Economic Co-operation Administration are being received by Arch K. Jean, chief, Division of Personnel, Department of State, Washington 25, D. C. Personal interviews may be had with Lewis B. Fulwiler, Division of Personnel, Department of State, Room 315, Walker-Johnson building, 1734 New York avenue N. W., Washington.

Would Repeal Unpopular Tax

The widely unpopular tax on transportation of property would be repealed under a bill introduced by Rep. George MacKinnon (Rep., Minn.) and identified as H. R. 6196. With other bills that would revise the present tax structure, it has been referred to the Ways & Means Committee.

"The transportation tax is a particularly vicious form of taxation because it discriminates against those regions of the country that are compelled to transport their goods substantial distances," stated Mr. MacKinnon.

States most discriminated against, Mr. MacKinnon pointed out to STEEL, are Minnesota, Nebraska, Missouri, Illinois and Maryland, with New York and Pennsylvania not far behind. To show the effects of the transportation tax on citizens of the respective states, Mr. MacKinnon has compiled the following table:

Internal revenue receipts, fiscal year ended June 30, 1947

Districts	Transportation of property—3 per cent of amount paid except coal, which is 4 cents per ton	1940 population	Per capita tax
Alabama	$ 1,638,907.62	2,832,961	$0.579
Alaska	148,926.07	72,524	2.053
Arizona	266,252.12	499,261	.533
Arkansas	330,150.23	1,949,387	.169
California	20,534,565.33	6,907,387	2.972
District of Columbia	4,988,108.15	.....	...
Colorado	2,074,507.80	1,123,296	1.846
Connecticut	4,679,825.59	1,709,242	2.738
Delaware	284,876.45	266,505	1.068
Florida	1,160,721.07	1,897,414	.611
Georgia	1,790,118.49	3,123,723	.573
Hawaii	275,042.40	423,330	.649
Idaho	364,010.55	524,873	.693
Illinois	38,543,049.18	7,897,241	4.880
Indiana	2,620,426.26	3,427,796	.764
Iowa	1,584,054.14	2,538,268	.624
Kansas	3,506,380.06	1,801,028	1.946
Kentucky	3,480,241.51	2,845,627	1.223
Louisiana	1,332,449.86	2,363,880	.563
Maine	999,755.17	847,226	1.180
Maryland	10,221,755.64	1,821,244	5.613
Massachusetts	5,457,931.42	4,316,721	1.264
Michigan	8,433,652.13	5,256,106	1.604
Minnesota	11,238,473.39	2,792,300	4.024
Mississippi	345,751.68	2,183,796	.158
Missouri	15,204,457.01	3,784,664	4.017
Montana	361,435.03	559,456	.646
Nebraska	5,329,602.78	1,315,834	4.050
Nevada	96,254.95	110,247	.873
New Hampshire	225,151.97	491,524	.458
New Jersey	4,106,762.79	4,160,165	.987
New Mexico	161,115.41	531,818	.302
New York	44,404,130.72	13,479,142	3.294
North Carolina	3,635,625.86	3,571,623	1.017
North Dakota	130,374.98	641,935	.203
Ohio	12,459,147.78	6,907,612	1.803
Oklahoma	1,309,633.28	2,336,434	.560
Oregon	2,193,670.55	1,089,684	2.105
Pennsylvania	30,077,068.49	9,900,180	3.380
Rhode Island	254,866.30	713,346	.357
South Carolina	337,867.90	1,899,804	.307
South Dakota	314,536.48	642,961	.489
Tennessee	2,018,342.56	2,915,841	.692
Texas	11,060,904.62	6,414,824	1.724
Utah	542,097.69	550,310	.985
Vermont	519,947.50	359,231	1.447
Virginia	10,175,191.68	2,677,773	3.799
Washington	1,742,666.40	1,736,191	1.003
West Virginia	430,897.02	1,901,974	.226
Wisconsin	2,185,158.43	3,137,587	.696
Wyoming	124,574.19	250,742	.496

Arms Export Licensing

Beginning Apr. 15, the Office of International Trade no longer issued licenses for exportation of items which were added to the list of "articles which shall be considered arms, ammunition and implements of war" by the President's Proclamation, issued Mar. 26 (STEEL, Apr. 5, p. 53).

Control over such licensing is now the exclusive responsibility of the State Department.

Under the terms of the President's Proclamation, the classification "arms, ammunition and implements of war" has been broadened to include many articles which have in the past been subject to export regulations of the OIT.

Germans Await Corporate and Fiscal Reforms

DUSSELDORF, GERMANY

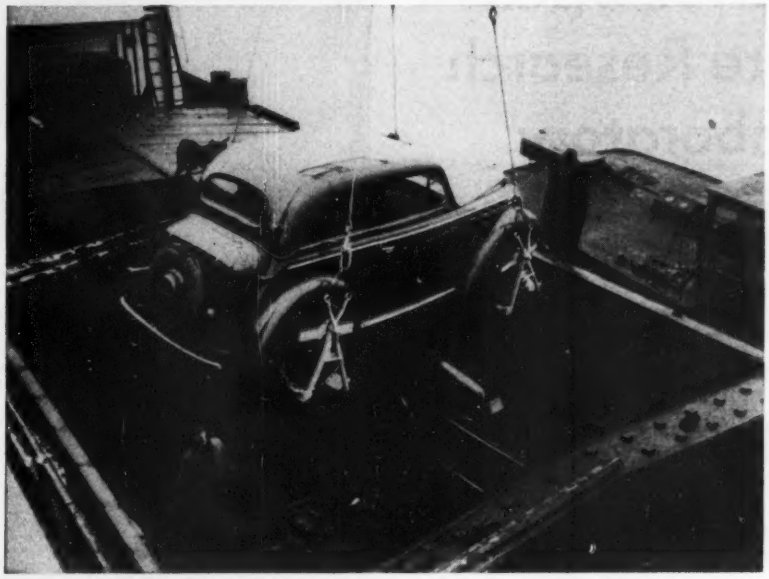
UPPERMOST in the minds of many German exporters and steel producers is the impending currency reform which is expected to take place by June or July.

Currently there is no fixed foreign exchange rate for the German mark, and the Allied control authorities can vary the rate with prevailing price fluctuations here and abroad. This policy is resented strongly and it opens the Allies to suspicion that the rates are set to the advantage of foreign competition.

A currency reform could make German steel and many other products competitive in world markets. If the exchange rate should be set at five marks per U. S. dollar, which many Germans believe would be a good ratio, a variety of German goods, at present prices, would be below the world market. Pig iron for example, could be priced at $36 per metric tons, compared with $90 in the world market. Coal, $18 in the world market, could be sold for $6.

Manufacturers of building materials, including structural steel, could be competitive if the rate were set as low as three marks to the dollar, and the same holds true for manufacturers of many durable goods, such as diesel engines. The cutlery industry, on the other hand, would need six to the dollar to be a match for Italian and British firms. Setting the rate at five for one, however, is regarded as best for the majority and would allow for some cost increases which might occur with the reform.

Steel Shakeup Due — Corporate structure of the whole German steel industry will undergo a thorough revision in the near future. For the past two years it has been caught between two conflicting ideas. The British have aimed at nationalizing coal mines and steel plants, using the North German Steel Control Office and the custodian office as the means of breaking up old companies and forming a new gigantic horizontal and semipublic super-trust. The Americans have aimed at decartelization and deconcentration. Lately the American view has changed, recognizing that the procedure as being carried out is wasteful and unproductive. To attempt to solve the vexing problem of what size individual units to allow the Germans to have, the Americans recently asked the large steel companies to file their own proposals on how the deconcentration law should be applied.



GERMANY EXPORTS AUTOS: One of the first automobiles to be exported from Germany since the war, this Opel Olympia 2-door sedan is loaded on a barge for shipment to Antwerp, Belgium. The Opel company is also fulfilling contracts with Holland and Switzerland. NEA photo

The Americans know, of course, that the German companies will propose to keep the steelmaking processes together down to the manufacture of rolled products, and to discard only such affiliations as are not vital from the practical steel man's point of view. Such activities as shipbuilding, construction, etc., thus probably will be sold.

Economically-Sized Units — The most economical size of steel plants in the Ruhr has come to be regarded as about one million tons capacity and units of that size will probably survive. It is interesting to note that the custodian office is veering toward this aim and will probably try to swallow the additional plants into its super-trust.

The Americans now seem to regard the deconcentration act as an instrument for preventing rearmament and for wielding economic power only, while the British appear anxious to use the same law as a vehicle for socialization, no matter how big the ensuing public steel monopoly might become.

The necessity for creating a workable Western Union in Europe and for raising European production to top capacity seems to act as a brake against socialist tinkering, and since the Americans in charge of the Ruhr problem now seem to have sensed the inherent dangers of the course taken so far, rather far-reaching changes in the present set-up appear likely. This is particularly true if foreign capital is to be attracted to Ruhr industries.

U. S. Per Capita Steel Output Is World's Top

In the United States in 1947, the per capita production of ingot steel and steel for castings was about eight times as large as the per capita output for the entire world, according to an analysis by the American Iron & Steel Institute.

The per capita output of steel in the United States in 1947 was 1180 pounds, while the average for the entire world was 148 pounds. The study indicates that close to 159 million tons of steel were produced in the world during 1947, of which 53 per cent, or 84,784,000 tons, were produced in this country.

Belgium and Luxemburg enjoyed the second highest per capita rate of production at 1124 pounds. Great Britain produced 572 pounds per capita, South Africa 566 pounds, Canada 472 pounds, Czechoslovakia 405 pounds, Sweden 384 pounds, Australia 348 pounds, France 312 pounds. Russia turned out relatively less than any of these nations, accounting for 232 pounds per capita. Hungary made about 144 pounds per capita, Austria 106 pounds, Poland 138 pounds and Italy 83 pounds. Lack of data from the Russian zone of Germany prevents calculation of Germany's steel production record.

Oliver Opens Ore Research Laboratory

OLIVER Iron Mining Co., U. S. Steel Corp. subsidiary, has established an iron ore research laboratory in Duluth, primarily for long-range studies into methods of concentrating taconite in the expectation that supplies of higher grade ores will gradually become exhausted.

Taconite, which has 25 to 35 per cent iron content, is a compact, siliceous rock that must be ground to fine particle size before its iron oxide content can be effectively separated from the silica and minor gangue materials. Billions of tons of this low-grade ore exist in this country, according to current estimates.

Designed for Rapid Change-Over—One feature of the Duluth laboratory is the pilot plant design which permits rapid change-over from one type of equipment to another and one type of taconite ore to another. Using the principle of a boy's construction set, the pilot plants are located in areas whose only fixed equipment consists of vertical steel columns, cross members and a small crane. Units necessary for a particular run, or "flow sheet" as it is called, are installed as needed and dismantled when no longer required for storage on the top floor of the laboratory building. The largest pilot plant area extends from a well in the basement through an opening in the first floor to the first floor ceiling, providing a total vertical space of about 27 ft. Production is limited in this area to about one ton per hour.

Another feature is the batch laboratory where tests of 1 to 1000 pounds of representative material are conducted in bench-mounted units such as froth flotation cells (see the accompanying picture), magnetic separators and so on. Here individual phases of ore concentrating problems are studied, while in the pilot plant areas conditions approaching the commercial scale are simulated so that problems arising in such operations may be anticipated.

Facilities for chemical analysis and mineralogical examination are also provided. The chemical laboratory is equipped with every type of analytical apparatus and reagent for the specialized work carried on in Duluth, in addition to regular equipment for routine work. The microscopic laboratory is equipped with microscopes of several designs, all capable of being adapted to microphotograph, and a metallographic microscope of modern design.

Ores are tested here by the froth flotation method at the new research laboratory in Duluth of Oliver Iron Mining Co., a U. S. Steel Corp. subsidiary

Taconite To Fill Gap—The Duluth laboratory is of great importance, explains Walter L. Maxson, Oliver vice president in charge of research, because the future ore supply from the Minnesota region will contain increasing proportions of high-cost underground ore and concentrates. Ultimately this ore supply will consist largely of concentrates. A review of the past 100 years' mining activity shows that more than 2¼ billion gross tons of iron ore have been shipped from the Lake Superior mines. Of this amount 1619 million tons, or almost 72 per cent, came from Minnesota.

Peak war demands on the Minnesota ranges took almost 300 million tons from 1940-45, or 20 per cent of the total high-grade direct shipping ore mined in both underground and open pit properties since these Minnesota deposits were discovered.

Tay-Holbrook Marks 100th Anniversary

Tay-Holbrook Inc., San Francisco, jobber and wholesaler of plumbing, heating and tinning supplies, this year celebrates its 100th anniversary.

Firm had its origin in a partnership known as Sanford, Fox & Backus which made and sold supplies for gold miners in 1848. George H. Tay joined the company in 1857 and by 1892 the firm was first incorporated as George H. Tay Co. At that time stoves and hardware items were manufactured at the company's foundry. This was abandoned in 1900 and since then the firm has devoted its activities to jobbing and wholesaling. In 1929 the Tay organization purchased Holbrook, Merrill & Stetson, another West Coast plumbing and heating firm, to form the present Tay-Holbrook Inc.

Officers of the firm include J. Milton Hagler, president, and Arthur N. Brewer, vice president.

Republic Sells Two Oil Country Supply Firms

Republic Steel Corp., Cleveland, has sold the properties and assets of its subsidiary, Republic Supply Co., Houston, Tex., and the majority interest Republic Steel held in Howard Supply Co., Los Angeles. These companies operate oil country supply stores and pipe yards.

Republic Supply was sold to a group of individual investors headed by Robert S. Kerr, former governor of Oklahoma, and D. A. McGee, oil operator. Howard Supply was sold to Harold E. Howard, president, and a group of associates.

The purchasers will continue to act as distributors for Republic products.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

American Rolling Mill Co., Middletown, O., has officially changed its name to Armco Steel Corp.

—o—

A. B. Murray Co. Inc., Elizabeth, N. J., will open an additional warehouse and shop for the distribution and fabrication of tubular steel products May 1 at McKeesport, Pa., on a tract formerly occupied by National Tube Co.

—o—

Tabor Mfg. Co., Philadelphia, manufacturer of foundry equipment, has appointed Snow & Galgiani, San Francisco, as its representative in northern California.

—o—

McGraw Electric Co., Elgin, Ill., announces that export activities of its Toastmaster Products Division will be handled by Borg-Warner International Corp., Chicago.

—o—

Los Angeles Chamber of Commerce reports that industrial growth in the Los Angeles area in March totaled $8,211,500, as compared with $7,022,000 in February.

—o—

Boeing Airplane Co., Seattle, reports its steadily climbing employment now totals 18,766 at the Seattle plant, compared with 12,349 last Sept. 1.

—o—

Bloom Engineering Co. Inc., Pittsburgh, manufacturer of industrial and steel mill furnace burners, has purchased Paulsen Engineering Co., Cleveland, maker of blast furnace gas burners. Bloom will continue the design, manufacture and application of this equipment.

—o—

A. Milne & Co., New York, steel warehousing firm, has opened a warehouse at 172 Stanley St., New Britain, Conn.

—o—

Cherry Rivet Co., Los Angeles, has opened a branch at 5707 W. Roosevelt Rd., Cicero, Ill. Facility will stock the firm's rivets and will maintain a service shop for tool repairs.

—o—

United States Atomic Energy Commission has announced a program to stimulate discovery and production of domestic uranium by private enterprise. Program embodies a government minimum price guarantee on both high and low-grade ore and offers a bonus of $10,000 for discovery and production of high-grade uranium ores from new domestic sources.

—o—

Gray Iron Founders' Society, Cleveland, is revising its Cost Manual No. 1 which describes a basic cost accounting system for gray iron foundries. The new manual No. 2 will embody revisions expected to simplify and clarify procedures.

—o—

Massachusetts Institute of Technology, Cambridge, Mass., is establishing a school of engineering practice for graduate training in the engineering aspects of atomic energy for its own students in the production plants of the Atomic Energy Commission operated by Carbide & Carbon Chemicals Corp. at Oak Ridge, Tenn.

—o—

Chicago Association of Commerce & Industry has published its 1948 edition of the Buyers' Guide & Industrial Directory of Chicago which lists products and services of more than 9900 Chicago area firms.

—o—

Bristol Co., Waterbury, Conn., manufacturer of controlling, recording and indicating instruments for industrial applications, is conducting a series of two-week courses for plant instrument and operating men in the theory and application of industrial instruments. Courses are under the direction of F. A. Faust of Bristol's education department.

—o—

Westinghouse Electric Corp., Pittsburgh, Pa., reports that some 5000 of its employees in 1947 figured out 7755 new and better ways to do their work and received a total of $105,000 in awards.

—o—

B. F. Goodrich Co., Akron, reports the conveyor belt, now being produced at twice the rate prevailing in 1940, is the only major rubber item which is not plentiful. A four to seven months' backlog of orders exists, and the shortage is expected to continue for at least another year.

—o—

McKay Co. has moved its Chain Division's sales office to its general headquarters at 1005 Liberty Ave., Pittsburgh. The McKay electrode sales office remains at York, Pa., site of the company's chain and electrode manufacturing plants.

—o—

ACF-Brill Motors Co., Philadelphia, announces that its Hall-Scott Motor Division has appointed Great Lakes Auto Parts & Machine Works Inc., Duluth, as distributor for Hall-Scott truck, industrial and marine engines and parts in Minnesota, northern Wisconsin and northern Michigan.

—o—

General Electric Co., Schenectady, N. Y., reports employees of the Hanford, Wash., Works which it operates for the Atomic Energy Commission have been afforded the opportunity to take graduate and undergraduate work at the University of Washington, Washington State College, the University of Oregon, Oregon State College and the University of Idaho.

—o—

Bendix Home Appliances Inc., South Bend, Ind., has purchased H. J. Rand Washing Machine Corp., Cleveland. Purchase gives Bendix control of patent applications covering the Rand-type machine.

—o—

Hays Corp., Michigan City, Ind., manufacturer of industrial control apparatus, will fabricate its automatic combustion control equipment and instruments and controllers used in process plants in a new factory recently opened in Michigan City. Factory was built to make room in the main plant for production of a new line of electronic instruments.

—o—

Wigton-Abbott Corp., Plainfield, N. J., engineering and contracting firm, has leased a branch office in Newark, N. J.

—o—

Bureau of Mines has chosen the campus of the University of North Dakota, Grand Forks, N. D., as the site for a lignite research laboratory.

—o—

Pullman-Standard Car Mfg. Co., Chicago, reveals that its Hammond, Ind., plant has been named winner in its all-plant safety contest for 1947, establishing a record low frequency rate of only 1.13 accidents for every million man-hours worked.

—o—

Hose Accessories Co., Philadelphia, manufacturer of hose couplings and accessories, has opened a factory branch at 1500 S. Western Ave., Chicago.

—o—

Threadwell Tap & Die Co., Greenfield, Mass., is introducing a new line of products to consist of plain plug and ring gages, thread gages, snap gages, dial indicator snap gages and special fixed size gages.

—o—

Midwest Iron & Steel Co., Chicago, dealer in scrap iron and steel, has changed its name to Midwest Compressed Steel Co.

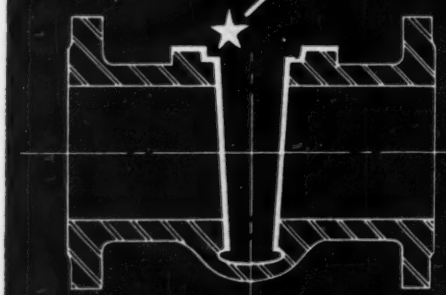
This BULLARD 36" Cut Master is "really paying off" at Newport News Shipbuilding & Drydock Company. Here you see it taper boring a large valve. On this job, it also faces the flange and counter bores, as shown on the cross-sectional drawing. The Cut Master not only saved 33⅓% on these three operations but also provided such a smooth finish that a grinding operation was eliminated.

PERFORMANCE REPORT FROM NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

CUTS COSTS 2 WAYS ON CAST STEEL VALVES with a 36" BULLARD Cut Master

1. SAVED 33⅓% ON 3 OPERATIONS

2. ELIMINATED A GRINDING OPERATION



Cross sectional drawing of valve with heavy lines indicating machined surfaces.

BULLARD

You, too, can expect savings on most of your jobs. It's easy to see why: The bed is cast in one heavy, rigid piece. Spindle is firmly supported top and bottom by large Timken roller bearings. Screw feeds provide and maintain a high degree of machining accuracy.

OTHER COST-CUTTING ADVANTAGES

Because the BULLARD Cut Master was designed specifically to save time on and between cuts, you find other unique features. The rapid and positive speed selection with the BULLARD pendant type control, limit-stops for simplified dimensional duplication, and centralized operating controls speed up operations and conserve costs. For complete description of these and other distinctive features, as well as data on feeds, speeds and sizes, write for Bulletin CVTL-4-1 today.

THE BULLARD COMPANY, Bridgeport 2, Connecticut.

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

New Mercury announced by Ford in four body styles, powered by 110-horsepower engine. Styling reflects trend set by Hudson, Kaiser-Frazer and others

DETROIT

SECOND of the Ford Motor Co.'s all-new postwar passenger cars — the Mercury—was made public last week, hard on the heels of the Lincoln unveiling. It is being offered in four body styles—a four-door sport sedan, six passenger club and convertible coupes and station wagon, all with V-8 110-horsepower engines. Emphasis on sport models and the limiting of standard types to only two body styles is unusual but probably a smart move profitwise, since the price tags on convertibles and station wagons suggest a higher margin of profit for the builder.

Front-end styling, with its die-cast "waterfall" grille, is somewhat suggestive of the preceding Mercury, although the overall effect is much more massive and substantial. Viewed from the side, the full-length body crease and molding strip are suggestive of the Hudson style treatment. Front seat is 8 inches wider, rear seat 3 inches wider, by virtue of extending the body width to its full limit.

Spring suspension is new for a Ford model. Individual front wheel suspension of the swinging arm, coil spring type is combined with airplane-type direct action shock absorbers, installed inside the coil springs. Rear suspension includes two semi-elliptic leaf springs with full-length liners between the leaves and rubber-bushed shackles. Drive has been changed from the torque-type to the hotchkiss type, combined with hypoid rear axle.

The body is literally hung from the chassis on tension shackles instead of riding on it through the medium of compression shackles. This feature, plus the revised spring mounting geometry and transversely mounted shock absorbers, has eliminated the track bar, normally used to maintain rear-end stability.

New Type Axles—A new type of rear axle, apparently to be standard on all Lincoln, Mercury and Ford cars, eliminates the hub and has the wheel bolted directly to a flange on the axle. This allows a wheel to be dropped straight down when removed and facilitates changing wheels without taking off the car's fender skirts.

General Motors' New Departure Division, incidentally, will be one of three suppliers of a self-sealed rear wheel ball bearing to be used for the first time on Fords, Lincolns and Mercurys.

Originated and developed by New Departure, this axle shaft mounting is a compact, symmetrical bearing lubricated and sealed for life. The unit has been used on the Oldsmobile since 1934, on the Cadillac since 1936 and on the Pontiac since 1937.

The Mercury engine, as stated, develops 110 horsepower at 3600 rpm and displaces 255 cubic inches. Bore is 3 3/16 inches, stroke 4 inches. Larger water pumps are used, one on each bank of four cylinders and the pump shafts operate on ball bearings. These and other changes in the cooling system yield a reduction of 12 degrees in cylinder head hot spots. Intake manifold branches have been redesigned so they are horizontal after the engine is tilted 5 degrees in its bed, arresting flow of raw gasoline to rear cylinders. Switch to the hotchkiss drive has allowed engine mounts to be lightened and made more resilient.

Aluminum pistons, with steel struts cast in their skirts, are designed to eliminate "cold slap" during the warm-up period and permit "hot engine" clearances when fitting pistons to cylinders. Locked-in rod bearings are said to give better oil control and add to simplicity of design. Additional bolts have been provided at the rear bearing seal to insure a tighter crankcase-oil pan union and to eliminate possibility of oil leakage.

Wheelbase of the Mercury is 118 inches, curb weight 3600 pounds, overall length about 207 inches.

New Fords Coming—Within a few weeks, the new Ford will have made its bow and the entire Ford lineup will be off and running toward hoped-for record sales. Details of Ford models are being withheld for the present, although many suppliers and others have had a peek at it. They report that in appearance it combines some of the distinguishing features of Hudson, Kaiser-Frazer and Oldsmobile. Certainly there is nothing revolutionary about the new Ford products and those who had been expecting something "out of this world" from the remodeled Ford organization may be disappointed. Apparently policy-makers are hewing to a line of keeping in fairly close step with the rest of the industry, and of producing cars which are conservatively yet pleasingly styled, although catering to the public's desire for "big-car" appearance.

Assembly Line Extended—The new final assembly line in B Building at the Rouge Plant has been extended from 860 to 1100 feet and has capacity for better than 500 Fords per 8-hour shift, against 350 formerly. Another nearby assembly line extends 880 feet and will handle daily production of 250 Mercury models, although it will be some time until full capacity is realized.

Removal of truck and bus production to the Ford Highland Park Plant provided additional space for the new assembly lines. Two new building additions were constructed to provide space for receiving and storing parts, principal frame and chassis elements. On the second floor of the building

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,277	366,205
February	399,452	393,636
March	515,223*	443,588
April	.....	445,137
May	.....	404,191
June	.....	421,466
July	.....	400,944
August	.....	364,478
September	.....	444,501
October	.....	461,536
November	.....	417,493
December	.....	492,109
12 mos.	.....	5,055,284

* Preliminary.

Estimates for week ended:

	1948	1947
April 3	105,132	97,385
April 10	103,004	97,893
April 17	104,740	105,337
April 24	105,000	102,447

Estimates by Ward's Automotive Reports

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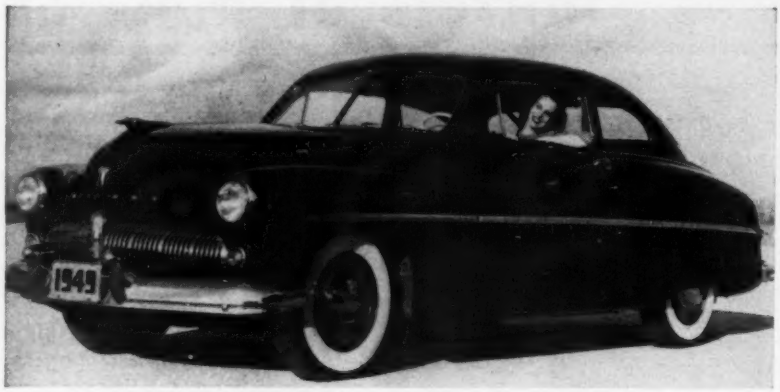


NEW MERCURY: Wider, lower, longer lines and room for six passengers feature this 1949 Mercury coupe. Front seat has been widened nearly 8 inches

new facilities have been added to metal finishing, body trim and paint departments, which utilize 115,000 square feet of floor space. New downdraft spray booths for finishing parts going into front-end assemblies have been installed. Fenders, gravel guards, grilles and other pieces formerly were painted by dipping.

A merry-go-round conveyor is being used in assembly of front-end parts, duplicating the system used by most other manufacturers. The front-end assembly now will join the chassis after the body has been bolted in place, a reversal of previous operations. The various rearrangements have called for a considerable amount of new conveyor equipment, there being 5.4 miles of overhead and 5.08 miles of floor-type conveyors now in B Building. Moving floor-type escalators have been increased in length on the final assembly line, permitting assemblers to ride alongside the moving line for 740 feet, beginning at the body decking stations.

Rouge To Be Dredged—Ford has announced the scheduled start of dredging operations in the River Rouge boat slip on May 1 to remove about 150,000 cubic yards of silt. The slip will be dredged to 22 feet, giving 21 feet of draft and permitting ore boats with cargoes of 14,000 tons to dock. It is 2650 feet long and 250 feet wide, and dredging also will include river areas on both sides of the slip. Dredging will be done with a clamshell type dredge mounted on a walking scow. Barges of 450 to 750 cubic yard capacity will be used to carry the silt to government approved dumping grounds in Lake Erie. The job will require about two months to complete and normally is undertaken every three years.

Foreign Operations Disappointing—On his return from an extended European trip during which he inspected company properties there and in England, Henry Ford II declares that he was not entirely satisfied with foreign operations. He indicated that managements there had failed to catch the "new spirit" of the Ford organization. Probably something will be done about it under the direction of Graeme K. Howard, recently elected vice president and director of the company's International Division, who accompanied Mr. Ford on his trip. Mr. Howard is an acknowledged expert on foreign operations, having headed this phase for General Motors during a large part of the quarter-century he served with GM. R. I. Roberge continues as general manager of the Ford International Division.

Scrappage Averages 1,898,067

Scrappage of motor vehicles for the 23-year period, 1925 through 1947, reached a total of 43,647,088 units, 87 per cent of them passenger cars, according to calculations of R. L. Polk & Co., statisticians for the industry. Since scrappage is virtually the replacement market, this means that replacement requirements add up to the substantial total of nearly 2,000,000 vehicles a year. Scrappage is figured by adding new vehicles sold in the period to those registered at the start of the period, then subtracting the number registered at the end of the period. Actual figure for average annual scrappage over the 23 years was 1,898,067. However, the yearly indicated scrappage totals vary widely; in 1941, for example, it was 5,342,743, while last year it was only 478,193. The latter possibly may be explained by the registration of cars which had been out of service during war years. Thus, in 1946 there was an indicated "negative scrappage" figure of 416,216, obviously the result of re-registrations exceeding the actual junking total.

Deny Cars Piling Up

Kaiser-Frazer Corp. last week denied allegations that Kaiser and Frazer cars were piling up in dealers' stockrooms and said sales in recent weeks have been exceeding production. It has become necessary to put dealers on allocations, the company said.

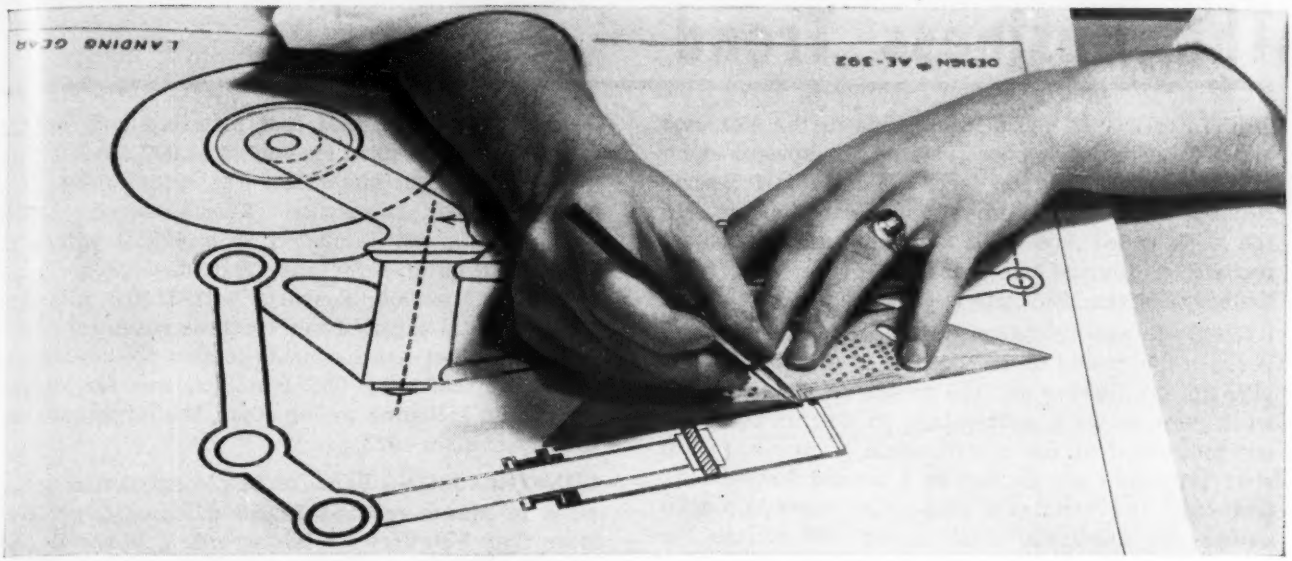
The company statement followed testimony by William R. Daley, president of Otis & Co., Cleveland banking house, in the Securities & Exchange Commission's investigation into the collapse of the recent proposed stock issue for Kaiser-Frazer. Daley said evidence of cars backing up in dealers' hands was an influence in the decision of Otis & Co. to drop the stock deal.

Steel in Auto Bodies

Interesting figures on steel consumption are contained in the annual report of Briggs Mfg. Co. In 1938, for example, production of bodies and body parts required 226,821 tons of steel, in 1939 it was 168,022 tons, then 165,382 tons for 1940, up to 268,857 tons in 1941. In the first postwar year, 1946, consumption was 194,282 tons, and the all-time high was set last year at 284,288 tons. Estimates for this year point to another record of around 338,720 tons, although this projection contemplates an increase both in available supplies of pig iron and in steel rolling capacity by company suppliers. Currently, reports are to the effect that Packard is literally "flooding" Briggs with body steel.

Steel consumed for automotive use in Briggs plants exceeded receipts by almost 2000 tons last year. This difference came from inventories which were at a low point when the year ended. Still the company lost 1,855,644 man-hours of production due to steel shortages. In addition, these make for serious complexities in manufacturing. Operations must be on a hand-to-mouth basis on many items, requiring more presses, tool and die men, die setters, etc., and accounting in part for the 60 per cent increase in the cost of an automobile body from 1941 to 1947.

In the Briggs Mack plant in 1941 there was one die setter for every 15 press operators. Six years later the number of press operators had increased 50 per cent but the number of die setters more than doubled, the ratio now being one die setter for every 10 press operators.



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The Business Trend

SETTLEMENT of the pension issue in the soft coal mines failed to start operations on the upward climb in all industries and, in fact, the delay in full-scale resumption of mining brought new curtailments. In the week ended Apr. 17, STEEL's index of industrial production dropped one point to 147 per cent (preliminary) of the 1936-1939 weekly average.

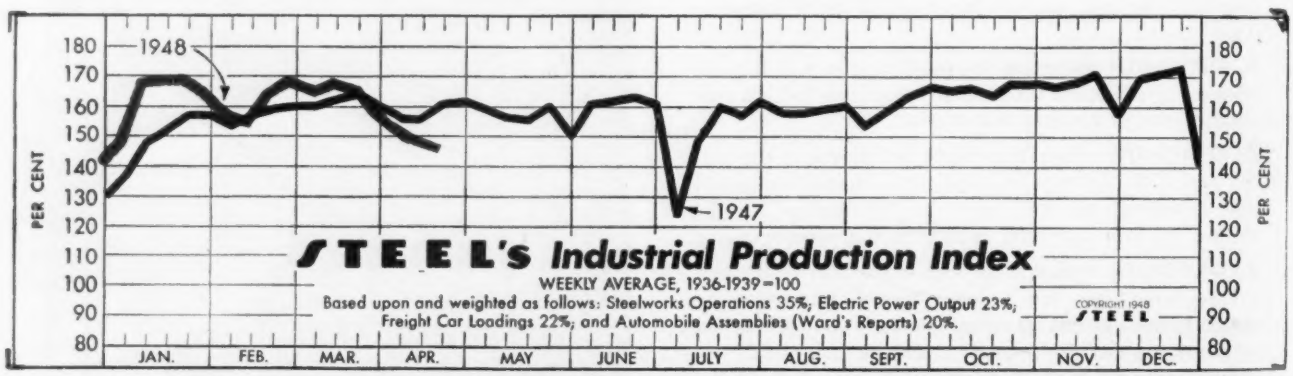
STEEL—In the Apr. 17 week the national ingot rate tumbled five points to 73 per cent of capacity as coal piles shrank further and the miners showed their unwillingness to work, particularly in digging the quality coal required for metallurgical purposes. Until steel producers are assured of a normal flow of coal, and until the inevitable post-strike operating difficulties are overcome, steel output will remain far under former levels.

AUTOS—Having kept production high throughout the miners' pension dispute, the automobile industry raised its turnout somewhat in the week ended Apr. 17 as evidence of its intention to make cars until its materials inventories are exhausted. Indications last week were this point would generally be reached by the first week in May, after which the flood of cars presently being built would be reduced to a dribble.

RAILROADS—Longer trains and increased rail shipments of iron ore, not affected by the government's coal-conservation measures, helped boost volume of freight carloadings during recent weeks, Association of American Railroads explains. In reporting on operating expenditures of Class I roads for last year, the association says that fuel, materials and supplies cost the unprecedented amount of $1,909,209,000. This was 18.5 per cent more than was spent in 1944, the peak war year, trafficwise. Fuel alone cost $691.6 million last year, compared with $553.2 million in 1946; expenditures for iron and steel products totaled $628.2 million, compared with $520.5 million in 1946. Capital expenditures by these roads for equipment and other improvements totaled $864,689,000 in 1947. Of this total, $565.9 million was for railway equipment, including rolling stock, the largest amount thus spent since 1923.

CONSTRUCTION—Value of new construction put in place in March reached $1,088 million, 17 per cent more than February's total, according to the Bureau of Labor Statistics. The industry added 94,000 employees during the month, to bring employment to 1,660,000. Compared with March, 1947, valuation was up 32 per cent and 126,000 more workers were employed.

PLANT IMPROVEMENTS — Manufacturing companies plan to spend $7.8 billion during 1948 for construction of new plants and purchase of new equipment, according to the Department of Commerce and the Securities & Exchange Commission. This is about 41 per cent of the total thus to be spent by all business, exclusive of agriculture. The 1948 total as estimated is 15 per cent higher than 1947 expenditures and is more than twice the amount spent in 1929 or 1941, the two best prewar years.



Index (chart above): Week ended Apr. 17 (preliminary) 147 Previous Week 148 Month Ago 164 Year Ago 161

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	73.0	78.0	96.0	95.5
Electric Power Distributed (million kilowatt hours)	5,087	5,033	5,145	4,660
Bituminous Coal Production (daily av.—1000 tons)	388	348	2,219	1,195
Petroleum Production (daily av.—1000 bbl.)	5,391	5,377	5,240	4,912
Construction Volume (ENR—Unit $1,000,000)	$144.6	$93.8	$90.3	$110.1
Automobile and Truck Output (Ward's—number units)	104,740	103,004	115,556	105,337

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

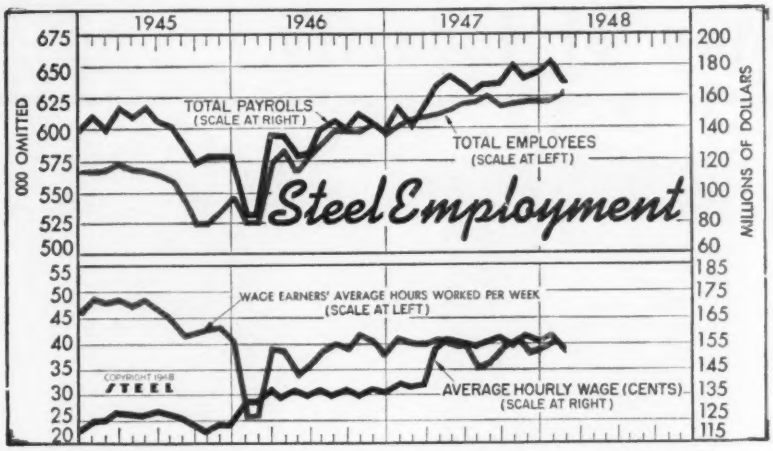
TRADE				
Freight Carloadings (unit—1000 cars)	700†	684	700	866
Business Failures (Dun & Bradstreet, number)	101	79	106	68
Money in Circulation (in millions of dollars)‡	$27,774	$27,833	$27,920	$28,163
Department Store Sales (change from like wk. a yr. ago)‡	+13%	−12%	+4%	−6%

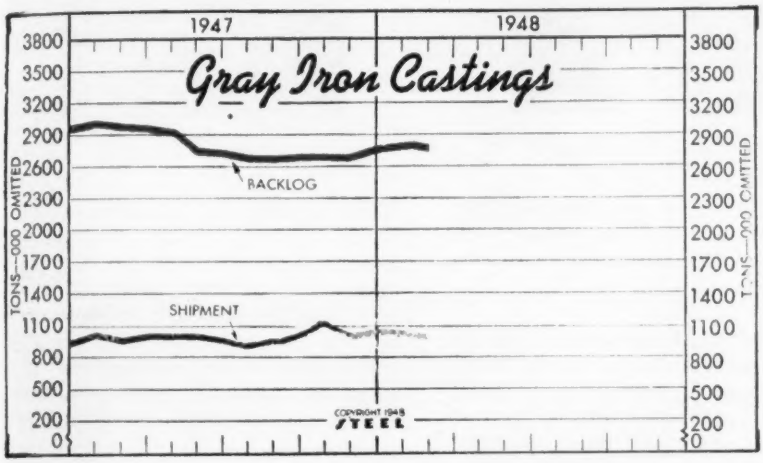
† Preliminary. ‡ Federal Reserve Board.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wages† (cents)	
	1948	1947	1948	1947	1948	1947
Jan.	622	601	$180.2	$155.8	157.3	138.1
Feb.	626	607	167.6	139.5	155.1	137.0
Mar.	....	609	....	150.6	....	137.9
April	....	611	....	168.3	....	153.3
May	....	615	....	175.8	....	155.6
June	....	623	....	167.6	....	154.7
July	....	623	....	163.2	....	153.9
Aug.	....	625	....	169.1	....	155.6
Sept.	....	618	....	168.9	....	157.1
Oct.	....	620	....	180.1	....	154.6
Nov.	....	624	....	171.0	....	158.7
Dec.	....	621	....	175.3	....	156.5

† Monthly average.





Gray Iron Castings

(U. S. Bureau of Census)

Tons—000 omitted

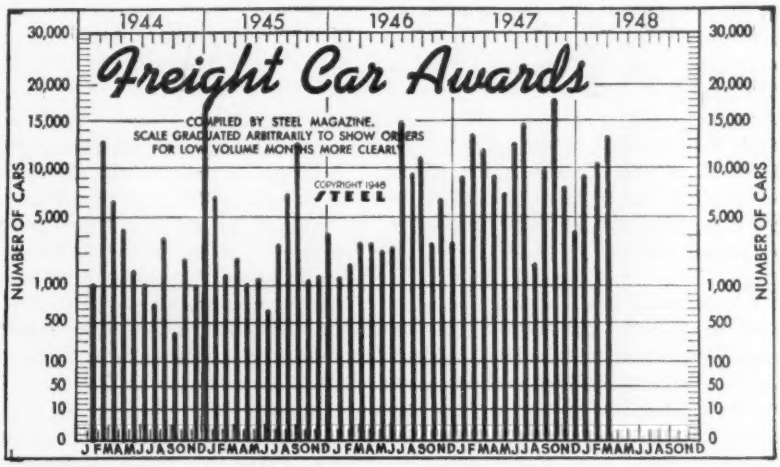
	Shipments		Backlogs*	
	1948	1947	1948	1947
Jan.	1,064	1,078	2,803	3,021
Feb.	1,024	1,010	2,769	2,987
Mar.	....	1,090	....	2,979
Apr.	....	1,097	....	2,908
May	....	1,097	....	2,783
June	....	1,038	....	2,711
July	....	913	....	2,657
Aug.	....	952	....	2,631
Sept.	....	1,025	....	2,680
Oct.	....	1,154	....	2,669
Nov.	....	1,020	....	2,687
Dec.	....	1,066	....	2,782
Total	....	12,541		

* Unfilled orders for sale to the trade.

Freight Car Awards

	*1948	*1947	*1946	1945	1944
Jan.	9,213	9,172	1,481	7,200	1,020
Feb.	10,698	13,727	2,328	1,750	13,240
Mar.	13,427	12,049	3,512	2,500	6,510
Apr.	....	9,296	3,564	1,120	4,519
May	....	7,389	2,900	1,526	1,952
June	....	12,784	3,335	670	1,150
July	....	14,840	14,836	3,500	795
Aug.	....	2,372	9,527	7,240	3,900
Sept.	....	9,917	11,102	12,840	400
Oct.	....	17,737	3,407	1,320	2,425
Nov.	....	8,169	6,690	1,650	1,065
Dec.	....	4,218	3,441	4,116	16,245
Total	....	†121,707	66,723	45,432	53,221

* American Railway Car Institute.
† Preliminary.


1944
1945
1946
1947
1948
Freight Car Awards
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NUMBER OF CARS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,651	$13,719	$15,212	$12,142
Federal Gross Debt (billions)	$252.3	$252.4	$253.5	$258.0
Bond Volume, NYSE (millions)	$23.4	$25.0	$17.5	$23.9
Stocks Sales, NYSE (thousands)	7,378	6,473	5,875	6,966
Loans and Investments (billions)†	$62.7	$62.2	$64.1	$63.1
United States Gov't. Obligations Held (millions)†	$35,214	$34,433	$36,193	$39,034

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$81.14	$81.14	$81.14	$69.82
All Commodities†	160.6	160.1	159.8	148.1
Industrial Raw Materials†	174.1	174.8	174.9	163.4
Manufactured Products†	156.0	154.9	154.3	142.0

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

J. J. BUCKLEY

STANLEY A. BRANDENBURG

KERMIT T. KUCK

Charles S. Traer, president, Acme Steel Co., Chicago, has been elected chairman, to succeed **Ralph H. Norton,** who has retired from this post after having been associated with the company since 1904. Mr. Norton will continue as a member of the board. **Carl J. Sharp,** formerly executive vice president, succeeds Mr. Traer as president, and **Chester M. McChesney,** engineering vice president, has been elected vice president. **John E. Ott,** general manager of consumer products sales, has been elected a vice president. Board members have been increased from nine to eleven, with the new posts being filled by **Allen B. Wilson,** general manager of producer products sales, and **Christopher D. Norton,** assistant manager of export sales.

—o—

J. J. Buckley has been elected president of Pacific Tube Co., Los Angeles. Since 1944 he has held the position of vice president and general manager, and during the eight years prior to his association with the company had been connected with a sister company, Superior Tube Co. **E. H. Lloyd** has been elected vice president of Pacific Tube Co. He formerly had been plant superintendent. **G. C. McEvoy,** formerly assistant treasurer, has been elected treasurer.

—o—

W. R. Hough, since 1945 chief engineer of Reliance Electric & Engineering Co., Cleveland, has been elected engineering vice president of the company. He joined Reliance in 1929.

—o—

Following the merger of Hodell Chain Co. with National Screw & Mfg. Co., Cleveland, the former company's president, **Fred G. Hodell,** has been elected a director and vice president of National Screw, and **Charles F. Newpher,** executive vice president.

—o—

Stanley A. Brandenburg, formerly general sales manager, Monarch Machine Tool Co., Sidney, O., has been made sales vice president, and **Kermit T. Kuck,** formerly chief engineer, has been named engineering vice president. Both men have been with the company since they entered business, Mr. Brandenburg in 1927 and Mr. Kuck in 1934.

—o—

Walker Davis has been appointed manager of sales of the Carbon Sheet & Strip Division, Lapham-Hickey Co., Chicago. He has had many years' experience in the steel business, specializing in flat-rolled products. He has been connected with Sharon Steel Co., Weirton Steel Co., and most recently, Carnegie-Illinois Steel Corp.

—o—

John C. Barnes has been elected president of National Radiator Co., Johnstown, Pa. Mr. Barnes was a former sales manager of the company's Washington and Philadelphia offices, respectively, and has been associated with the firm since 1940.

—o—

Farrar & Trefts Inc., Buffalo, has elected **George M. Trefts** as president, and **John C. Trefts Jr.,** as chairman. Their election followed the retirement of their father, **John C. Trefts,** as president. He will continue as a director.

—o—

A new division, known as the Tool & Die Control, has been established by American Car & Foundry Co., New York. **H. O. Amble** has been appointed manager of this division, and he will make his headquarters at the company's Berwick, Pa., plant, where he has been employed since 1932 as mechanical engineer. **H. F. Schwarting** has been appointed assistant district manager of the Madison, Ill., plant. He previously had been general electrical engineer at the St. Louis plant.

—o—

W. S. Austin, sales manager, LeMaire Tool & Mfg. Co., Dearborn, Mich., has been elected vice president of that company. He will continue as sales manager. For the past 13 years he has been district manager of the Detroit office.

—o—

A. S. Fredrickson, formerly vice president, has been elected executive vice president, Lakeside Bridge & Steel Co., Milwaukee. **R. W. Sternke,** shop superintendent and production manager, and associated with the firm 25 years, has been elected second vice president.

—o—

Louis N. Wilputte has retired as president of Wilputte Coke Oven Division, Allied Chemical & Dye Corp., New York. He will continue with the company as a consultant.

—o—

Fred J. Held, formerly vice president in charge of sales at Verson Allsteel Press Co., Chicago, has become associated with Ekstrom, Carlson & Co., Rockford, Ill., in the capacity of general sales manager. He succeeds **S. P. Ekstrom,** former president and sales manager, who has been appointed chairman of the board.

—o—

Frank J. Peterson has been appointed director of industrial rela-

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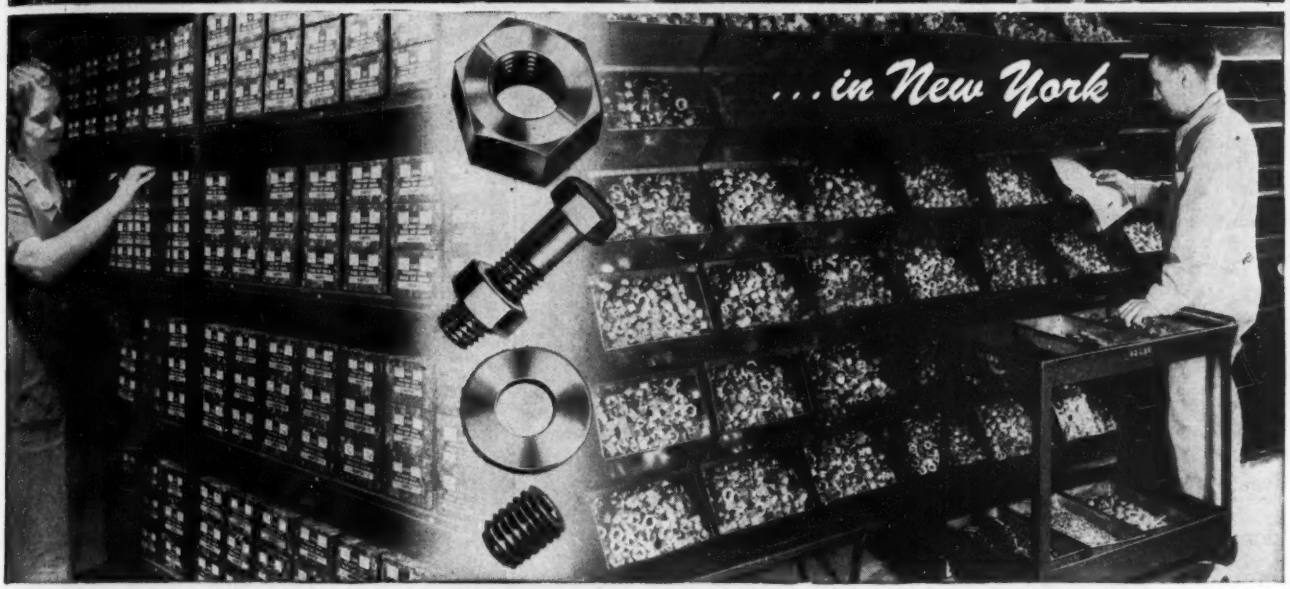

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tions for Lustron Corp., Columbus, O.

—o—

Air Reduction Sales Co., New York, announces the former apparatus sales department and the former arc welding sales department are merged into one department to be known as the equipment sales department. **Dale D. Spoor** has been named manager of the equipment sales department; **Ira B. Yates** has been named manager of arc welding and supplies sales; and **J. F. Carroll** has been named manager of apparatus sales.

—o—

Frank E. Wartgow has been elected vice president, Castle & Associates Inc., personnel counsellors, Chicago. He will have charge of the newly formed Foundry Division, which is offering a specialized and complete personnel service to the foundry industry. Mr. Wartgow was recently connected with Whiting Corp., Harvey, Ill., in the Foundry Equipment Division. Prior to that, he was a supervising engineer with Hasbrouck Haynes Engineers, Chicago, and before that he held supervisory positions with American Steel Foundries, Chicago.

—o—

George S. Brett has been appointed manager of the Kansas City, Mo., warehouse of A. M. Castle & Co., Chicago, and **R. N. Van Der Vart** will succeed Mr. Brett as manager of sales in Seattle.

—o—

Paul E. Pottker has been appointed assistant sales manager for Oil Well Supply Co.'s Witte Engine Works Division at Kansas City, Mo.

—o—

William D. Nesbeitt has been named manager of the Spokane, Wash., district office for Allis-Chalmers Mfg. Co., Milwaukee. **A. R. Kohlmetz,** whom Mr. Nesbeitt succeeds, remains in the Spokane office as special representative.

—o—

J. L. McCloud has been appointed director of chemical engineering and chemical and metallurgical research for the Ford Motor Co., Dearborn, Mich., succeeding the late **R. H. McCarroll.**

—o—

Liquid Conditioning Corp., Linden, N. J., announces addition of **James T. Henry** to the staff of L. S. Luther & Co., its Washington representative. Mr. Henry will be engaged in field engineering sales and service work.

—o—

Raymond K. McClintock has been appointed assistant to the chief engineer of Radio Tube Division, Sylvania Electric Products Inc., New York. He joined the radio tube engineering department in 1936, later serving as field engineer.

—o—

Dr. L. I. Shaw, director of the Air Force jet propulsion project at Alfred University for nearly two years, has resigned that post to become a rocket research engineer for Bell Aircraft Corp., Niagara Falls, N. Y.

—o—

W. M. Myler, assistant treasurer, Rockwell Mfg. Co., Pittsburgh, has retired after 46 years with the firm. He started as a bookkeeper for the Pittsburgh Equitable Meter Co. in 1902, and in 1907 became assistant secretary-treasurer of the firm. When Pittsburgh became a part of Rockwell Mfg. Co., he became assistant treasurer.

—o—

Consolidated Vultee Aircraft Corp., San Diego, Calif., has appointed **Georges de Sonchen** as director of European sales.

—o—

Fred C. Williams, general manager of Packard Motor Car Co. of Canada Ltd., has been elected a director of the Canadian automotive firm, to succeed the late **Col. E. S. Wigle.**

—o—

I. R. Kappler has been appointed manager of a newly created purchasing division of Dearborn Motors Corp., Detroit, marketing organization for Ford tractors and Dearborn farm equipment. He joined the company last summer, and has had wide experience in the purchasing departments of Republic Aviation Corp., Aircraft Engine Division of Packard Motor Car Co., and the Graham-Paige Motor Corp. **Ralph E. Hunt,** production specialist formerly associated with Nash-Kelvinator Corp., and General Motors' Frigidaire Division, has joined the executive staff of Dearborn Motors Corp. For the past 18 months he has been works manager of Universal Cooler Corp., Marion, O.

—o—

Harry L. Showalter, for many years associated with the drop forging industry in various capacities, is now associated with Erie Foundry Co., Erie, Pa., manufacturer of forging hammers and hydraulic presses, as sales representative in eastern Pennsylvania, in New Jersey, Maryland and Delaware.

—o—

Carl F. Unruh has been appointed acting director of purchasing for the Ford Motor Co., Dearborn, Mich., during the absence of **A. J. Browning,** vice president and director of purchasing. Mr. Unruh joined **Ford** in 1916. Since 1946 he has been purchasing agent.

—o—

Sublette M. Walton has been appointed industry manager of the Alumi-Drome Division of Reynolds Metals Co., Louisville. He will be in charge of sales and all operations connected with the Alumi-Drome, Reynolds' new all-aluminum, self supporting, all-purpose utility building. Since his affiliation with Reynolds about eight months ago, he has been serving in various capacities in the Parts Division. He had previously been president, Craft Mfg. Co., Nashville, Tenn.

—o—

Omar V. Greene has been promoted from assistant general sales manager to manager of product development for Carpenter Steel Co., Reading, Pa. **H. Sturgis Potter** has been promoted from manager of tool steel sales to sales manager in charge of all Reading products.

—o—

E. W. Bernitt has been appointed

I. R. KAPPLER

OMAR V. GREENE

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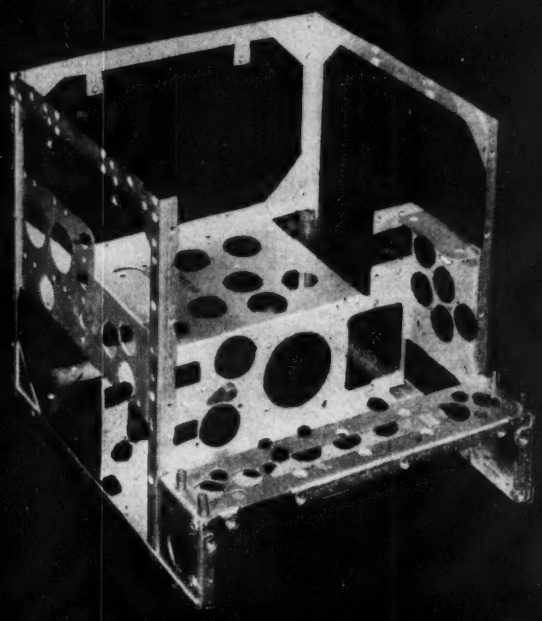

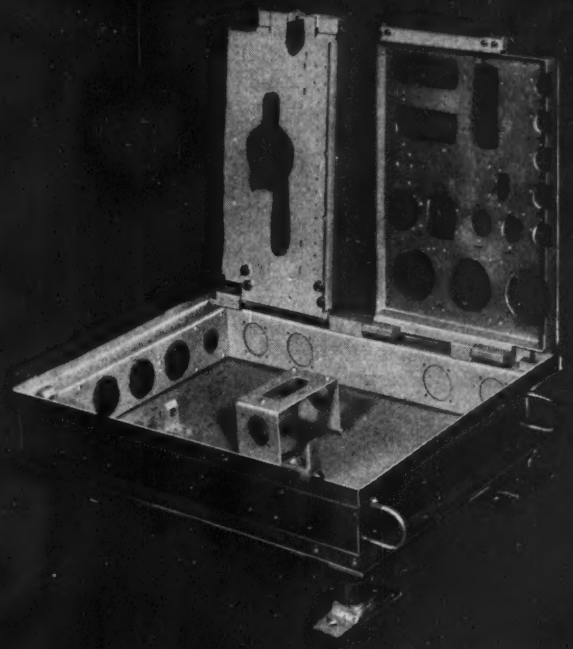

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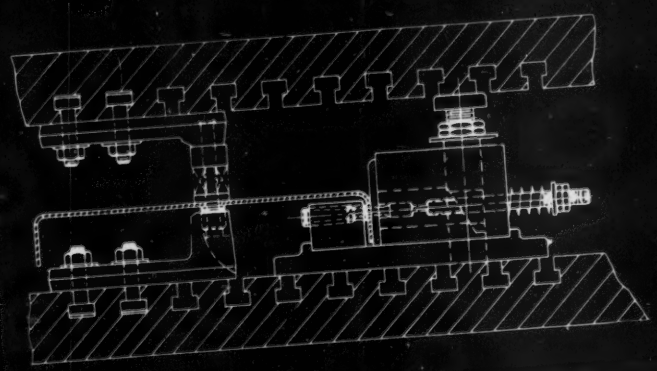

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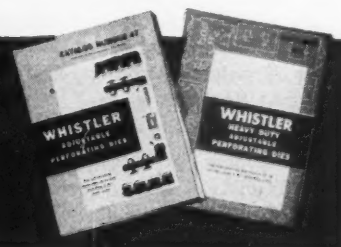


works manager of the Nash Motors Division plant of Nash-Kelvinator Corp., at Kenosha, Wis., succeeding the late **Harold E. Long.** Mr. Bernitt joined Nash in 1938 and for the past year has been staff engineer for all plants of the corporation, with headquarters in Detroit. **P. G. Little** has been named assistant works manager; **L. H. Finkler,** general superintendent, and **Walter Tobias,** assistant general superintendent.

—o—

Samuel H. Gifford has been appointed sales representative of Wayne Crane Division, American Steel Dredge Co. Inc., Ft. Wayne, Ind. Following a training period at the Wayne Crane plant, Mr. Gifford will take over some of the company's western territories.

—o—

Harold Weinstein, president, Calumet Iron & Supply Co., East Chicago, Ill., has been elected president of the Association of Steel Distributors Inc.

—o—

James D. Taylor, Taylor & Spottswood Co., has been elected president of the California Chapter of American Steel Warehouse Association Inc. Other officers are: Vice presidents, **Paul Childs,** Earle Jorgenson Co., and **George W. Boole,** A. M. Castle & Co.; secretary, **Harry Levitt,** Dunham-Carrigan & Hayden; chapter director, **William Kyle,** Kyle & Co.

—o—

James A. Farrell Jr. and **William F. Van Deventer** were elected to the board of directors of American Car & Foundry Co., New York, to fill existing vacancies.

—o—

Robert J. Barnett has been named associate manager of Rapids Handling Equipment Co., Grand Rapids, Mich.

—o—

Charles F. Hanks Jr. has joined the research department of Harbison-Walker Refractories Co., Pittsburgh. He formerly was associated with the Westinghouse Electric Corp. in the research laboratory at East Pittsburgh, Pa., and Emeryville, Calif.

—o—

Melwin Williamson has been named supervisor of Permanente Metal Corp.'s aluminum rod and bar mill, which will be installed at the company's Trentwood rolling mill near Spokane, Wash.

—o—

Appointment of **George W. Rukgaber** as district sales representative in the Chicago regional sales office has been announced by the Electro-Motive Division of General Motors Corp. He has been manager of General Motors' Train of Tomorrow from early in 1946 until his transfer to the present appointment. He has been connected with General Motors for 19 years.

—o—

Dr. George Oenslager, retired research chemist, B. F. Goodrich Co., Akron, was presented the first Charles Goodyear medal by the Rubber Division, American Chemical Society, at its spring meeting in Chicago, Apr. 22. Award of the medal was for Mr. Oenslager's contributions to rubber chemistry, his principal achievement being the discovery and use of organic accelerators in rubber vulcanization.

—o—

Appointment of **George R. Frankland** as Chicago district manager, has been announced by Products Division, Johns-Manville Corp., New York. He succeeds **Corydon H. Hall,** who resigned to become president and chief executive officer of a new company being organized in California. **William S. Hough,** formerly manager of the chemical and aviation sections of the company's special industries department at New York, will assume Mr. Frankland's former duties in Chicago as assistant district manager, Industrial Products Division.

—o—

James A. Coe & Co., Newark, N. J., announces that **Arthur J. Beal** and **Jack E. Papy** have joined its sales organization. Mr. Beal was recently with Reliance Steel Division, Detroit Steel Corp., Lyndhurst, N. J., and formerly was New England district manager of Great Lakes Steel Corp., Ecorse, Detroit. Mr. Papy was recently with Edgecomb Steel Corp., Hillside, N. J., and formerly with Allegheny Ludlum Steel Corp. in its metallurgical sales department.

—o—

Herbert H. Roosa, sales manager, Manzel Inc., tool and equipment manufacturer, Buffalo, has been elected vice president, sales.

—o—

K. P. Rindfleisch, U. S. Steel Supply Co., has been elected president of the Pittsburgh Chapter of American Steel Warehouse Association Inc. **F. B. Lorenz,** Edgar T. Ward's Sons Co., and **J. M. Malone,** C. A. Turner Inc., have been named vice presidents. **A. P. Levinson,** Levinson Steel Sales Co., was made treasurer, and **Donald C. Lott,** Fort Duquesne Steel Co., secretary. **Harry E. Williams,** Williams & Co. Inc., was named chapter director.

—o—

Webster G. Todd, formerly chairman of the board of Todd & Brown Inc., has been appointed to the executive committee of American Wheelabrator & Equipment Corp., Mishawaka, Ind. He is aso a member of the board of directors.

ALFRED IDDLES

—o—

A. C. Pratt, president, Babcock & Wilcox Co., New York, has been elected chairman of the board. **Alfred Iddles,** previously a vice president, has been elected president and chief executive officer of the company. Mr. Pratt has been with the company for 45 years, during seven of which he served as a vice president, and 24 years as president. Mr. Iddles joined the company in 1937 and became a vice president in 1945. **W. T. McCullough Jr.,** who is in charge of stationary boiler sales, and who was formerly sales manager of the Chicago office, has been elected a vice president; **W. G. Dryden,** formerly treasurer, has been elected secretary and treasurer; and **C. W. Middleton,** vice president and secretary, has withdrawn from full-time active service in the company, but will continue as a director and in a consulting capacity. **W. H. Rowand** has been named chief engineer, a newly created position in which Mr. Rowand will assume most of the engineering activities previously handled by Mr. Iddles.

—o—

Reed Rolled Thread Die Co., Worcester, Mass., has appointed **Fred E. Duerre** of the Production Tool Sales Co. as its representative in northern New Jersey, with office located at 2 North Dean St., Englewood, N. J.

—o—

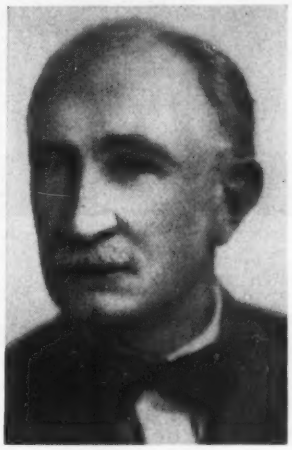
Paul Kates has been appointed factory superintendent, Industrial Enameling Inc., New Orleans, La. He previously had been connected with the sales and service organization of Ferro Enamel Corp., and for the past

THOMAS S. NICHOLS

Elected president and chief executive officer, Mathieson Chemical Corp., New York. Noted in STEEL, Apr. 19 issue, p. 64

W. H. BROWN

Elected president and chief executive officer, Hoskins Mfg. Co., Detroit. Noted in STEEL, Apr. 19 issue, p. 68



PETER D. WHITE

Elected president, Babcock & Wilcox Tube Co., subsidiary of Babcock & Wilcox Co., New York. Noted in STEEL, Apr. 19 issue, p. 64

eight years has been manager of the company's Nashville sales territory. He is succeeded in that territory by **Roy H. Jaeger,** recently St. Louis district manager for Ferro Chemical Corp., a Ferro Enamel Corp. subsidiary.

—o—

Wiremold Co., Hartford, Conn., announces the addition of three men to augment its sales force in New York, Chicago and Philadelphia. **Thomas J. Pugh** will assist **Walter S. Beckett,** district sales manager at Philadelphia; **Charles J. Wirtz** has been added to the Chicago staff under **Ambrose J. Massey;** and **Robert J. Brazill** will assist **George W. Sundstrom** in the metropolitan New York area.

—o—

Personnel changes at the Bristol, Conn., plant of New Departure Division of General Motors Corp. are as follows: **William J. Ryan,** formerly mechanical superintendent, now becomes assistant to the general manufacturing manager. **Harry Simpson,** assistant superintendent of the forge plant, has been appointed acting mechanical superintendent. **Harold Draper,** foreman of the transitorq department, has been appointed senior engineer, research and/or experimental, in the mechanical department, under the direction of the mechanical superintendent. **Herbert A. Maronn,** grinding wheel supervisor for Building 32, now becomes abrasive supervisor for all departments.

—o—

E. H. Reyer has been named superintendent of the open hearth department, Keystone Steel & Wire Co., Peoria, Ill., succeeding the late **A. E. Getz.**

OBITUARIES . . .

M. W. Field, 49, comptroller, American Steel & Wire Co., U. S. Steel Corp. subsidiary, died at his home in Shaker Heights, O., Apr. 19. He joined United States Steel Corp. in 1940, serving first in Carnegie-Illinois Steel Corp.'s cost planning department, and later transferred to U. S. Steel Corp. of Delaware at Pittsburgh as procedure supervisor. In July, 1944, he moved to American Steel & Wire Co., Cleveland.

—o—

Paul M. King, 66, vice president in charge of sales, Worth Steel Co., Claymont, Del., died Apr. 15, following a long illness. Mr. King had been associated with the company for 30 years, and had been identified with the steel industry for 48 years, having started with Worth Bros. Co., Coatesville, Pa., in 1900. He was a member of the American Iron & Steel Institute and the Steel Club of Philadelphia.

—o—

Samuel T. Buzzee, 63, vice president and director, Risdon Mfg. Co., Naugatuck, Conn., died Apr. 16. He had been affiliated with wire goods concerns in Connecticut for the last 40 years.

—o—

Edgar W. Bassick, 76, founder, Bassick Machine Co., Fairfield, Conn., died recently at his home in that city.

—o—

W. D. James, 66, president, James Mfg. Co., Fort Atkinson, Wis., died Apr. 16 in Madison, Wis., following a stroke suffered while attending a company board meeting. Mr. James founded the company in 1906.

—o—

Ennis W. Bachman, 61, head, Alloy Tube Division, Carpenter Steel Co., Union, N. J., died recently at Durham, N. C. He was a pioneer in the welding of stainless steel tubes and headed the division for 20 years.

—o—

Edward N. Greenleaf, 73, who retired on Jan. 1, 1947, as Los Angeles district office manager for Allis-Chalmers Mfg. Co., died Apr. 10.

—o—

Chester H. Gibbons, 58, application engineer at the Baldwin Locomotive Works, Eddystone, Pa., died Apr. 15 after a short illness. He was an authority on the testing of metals and well-known in the field of stress analysis.

—o—

G. A. Fritschi, 52, manager, Pittsburgh sales district, Vanadium Corp. of America, died Apr. 13 following a heart attack.

—o—

DeNyse W. Atwater, 53, head, engineering department at Bloomfield, N. J., of Westinghouse Electric Corp., died Apr. 13.

—o—

Patrick J. Shelley, 69, retired president, Metropolitan Electrical Mfg. Co., Long Island City, N. Y., died Apr. 17.

—o—

William L. McCasky, 66, vice president and sales manager in Chicago, Tennessee Stove Works, Chattanooga, Tenn., died Apr. 16 in Davenport, Iowa, while on a business trip.

—o—

J. Lloyd Crawford, 53, head, Detroit office of Fort Pitt Bridge Works, died Apr. 15. He had been in charge of the Detroit office for the past 10 years.

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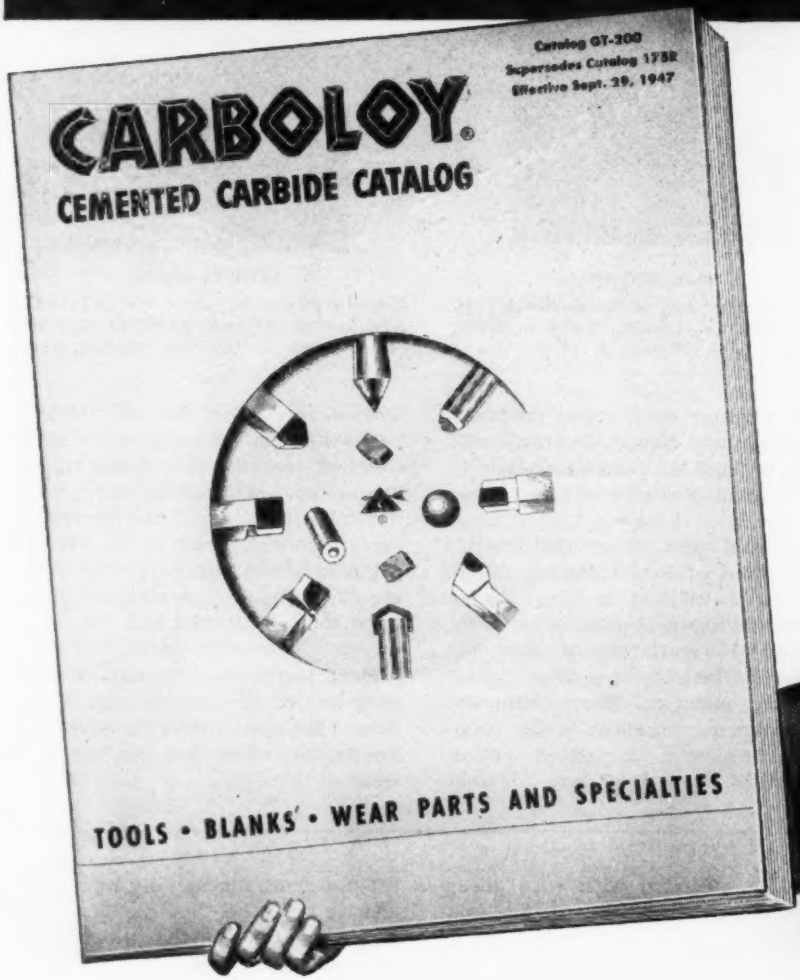

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Engineering News . . . AT A GLANCE

TO BOOST GAS SUPPLIES—Catalytic cracking procedures, familiar to the oil industry, are being applied in a Hyversion process revealed by Stacey-Dresser Engineering Co., Cleveland, to produce additional gas that can be introduced in city mains in any quantity desired to meet peak load requirements in communities using either natural or manufactured variety. Process is said to generate a low gravity carrier gas which subsequently can be enriched with propane or butane vapors to match combustion characteristics of the regular utility gas supply into which it is introduced.

THREE-SECOND AUTOMATIC ANNEALING—To process case hardened roller chain pins for subsequent riveting, Union Chain & Mfg. Co., Sandusky, O., recently worked out a setup with the aid of Airco, that only takes 3 seconds to anneal the ends of the pins. The installation is reported to increase production some 300 per cent, and is so simple that the sole function of the operator is to feed the roller chain pins into a chute which rolls them into position for the "flame softening" treatment.

HOT MATERIAL CARRIER—In Buffalo, Hewitt-Robins Inc., recently revealed the development of a hot materials conveyor belt which is cushioned with rubber and strengthened with glass. According to company tests, the material mover will not char, stretch or lose strength from heat under 350° F. After more than 6 months service in one foundry, carrying red hot foundry sand, the only damage found was a rip caused by the conveyor skirtboard. Average temperature of the sand during the period was 400° F.

"TAPE"-WOUND PRESSURE VESSELS—By winding metallic tape in layers on thin-walled tubes, the Germans were able to build pressure vessels of adequate strength for use in hydrogenation plants. According to the Office of Technical Services, Washington, tape was applied in two different widths, depending on size and working pressure of vessel. Those operating at temperatures up to 200° C are wound with a steel tape having carbon content of 0.20 per cent and yield point of 23 tons per square inch. For hot vessels up to 350° C wall temperature, tape used has an analysis of 0.15 per cent carbon, 1.0 per cent chromium, 0.5 per cent molybdenum, and yield strength of 22 tons per square inch. Winding lathe used includes an altered carriage to tow a large frame. Latter runs on a special track carrying a large spool of tape as well as some tape heating equipment.

"SUPER" METAL FOR RANGES—Titanium steel—a super metal sought by scientists in such form to meet extreme heats generated by jet plane engines—now is reported to be in limited use on the new electric range tops produced by appliance division of Westinghouse Electric Corp. The steel, which requires only a single coat of special porcelain enamel for its thin, tough, acid resistant, white finish, was developed by Inland Steel Co., and tested by Westinghouse for its use on the production line. It is a basic open hearth steel that contains enough titanium (about 0.5 per cent) to combine with the carbon in steel. This is said to reduce to a negligible point the high temperature effects of carbon in steel, such as sagging—buckling effect of the metal under enameling furnace heats of 1500 to 1700° F. Production of titanium steel range tops is now averaging 20 per cent of the total, however, the division is expected to swing over to the new top 100 per cent as soon as supplies of the new metal and special enamel increase.

LAZY FLAME BEST—When faced with a gas shortage, many companies depend on fuel oil as an alternate fuel. In using this fuel for heat treating furnaces employing radiant tubes, it is pointed out that a luminous flame—commonly referred to as a bright, lazy flame—is required for maximum combustion efficiency. The flame is a low-temperature one made luminous by glowing particles of carbon produced during combustion. Heat is transferred to the tube walls mainly by luminous flame radiation, with clear gas radiation playing a minor part. (p. 100)

"FLOATING" HAMMER — Drop-forging hammer employed by Ohio Injector Co., Wadsworth, O., to forge components of small valves is mounted on a floating base—actually a 130-ton block of reinforced concrete 14 x 10 x 12 feet, supported on 14 sets of nine 3-inch diameter springs. Floating 1-inch above the ground floor line, the "floating" base has yet to contact the floor during operations. Its vibration dampening is so effective that the hammer can be operated without disturbing delicate machining operations performed nearby. (p. 104).

HALVES MACHINING TIME—Machining time is cut by half or better in the plant of Flxible Co., Loudonville, O., through the use of air brakes as the clamping medium in the special jigs and fixtures designed by the concern for producing ambulance and bus parts. One fixture, used to process a gear shift control rod bearing box, for example, enables the work to be done on any 14-inch lathe at the rate of about 100 boxes every 11 hours. Scrap pieces are practically unheard of and tolerances are easily held. (p. 109).

OXYGEN FOR STEELMAKING — Commercial oxygen plants capable of producing more than 1000 tons of gaseous oxygen per day for the steel industry are envisioned as result of successful operation of a pilot plant producing 95 per cent purity oxygen by Elliott Co., Jeannette, Pa. Process is a low pressure system in which air is compressed to about 5 pounds per square inch gage, conditioned and cooled to below minus 300° F to a single fractioning column in which complete distillation takes place only a few pounds above atmospheric pressure. (p. 119).

News Summary—p. 69 *Market Summary—p. 145*

Heating Methods

FOR CONTROLLED ATMOSPHERE FURNACES

In this timely discussion the authors examine requirements of continuous muffle type, radiant tube and direct electric heating furnaces for gas carburizing, carbo-nitriding, malleable annealing and other high production processes

FROM the standpoint of heating method, controlled-atmosphere continuous furnaces for gas carburizing, carbo-nitriding, malleable annealing and other high-production heat treat processes fall into two major classifications: (1) Muffle-type furnaces, and (2) radiant tube furnaces. In addition, direct electric heating is used for some of these processes, as well as for high-temperature services. The applications, advantages and limitations of these various heating methods are discussed in the following paragraphs.

In controlled-atmosphere furnaces, the work is enveloped in a mixture of active and diluent gases while it is undergoing heat treatment. To maintain control of the gas mixture and to obtain desired results, the work chamber of the furnace must be sufficiently gas-tight to prevent air infiltration. In addition, with oil or gas heating, the furnace atmosphere must be kept free from products of combustion; and where electric heating is used, it is often necessary to separate the heating elements from the furnace atmosphere.

Muffle-Type Furnaces—To meet these requirements, the first controlled-atmosphere furnaces were of muffle-type construction—that is, with the work and its enveloping gas atmosphere enclosed in a chamber called a muffle, Fig. 3. The muffle is heated by gases passing around its exterior, and the work in turn is heated by radiation from the muffle walls. Direct firing is often used, with the burners arranged so as to avoid localized heating or "hot spots."

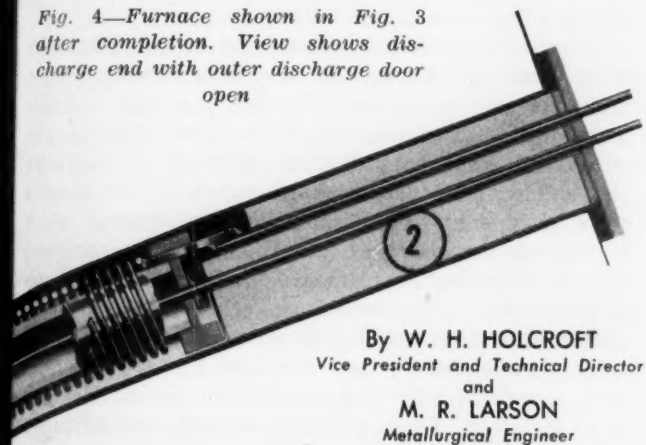
Ceramic muffles were used for the earlier furnaces, since this was the only material able to withstand

Fig. 1—Close-up of radiant tube furnace, showing closed-head burners and piping arrangement. Gas header is located near the floor and the combustion air header is near top of furnace to permit simple piping. Peephole in each burner and return leg permits easy checking of combustion characteristics

Fig. 2—Sectional view of electrically-heated radiant tube. Heating element alone, or the entire assembly, can be removed and replaced without shutting down the furnace

Fig. 3—Top view of Holcroft muffle-type furnace with roof removed. Corrugated design of muffle provides maximum strength with minimum wall thickness, resulting in lower materials cost and higher rate of heat transfer

Fig. 4—Furnace shown in Fig. 3 after completion. View shows discharge end with outer discharge door open



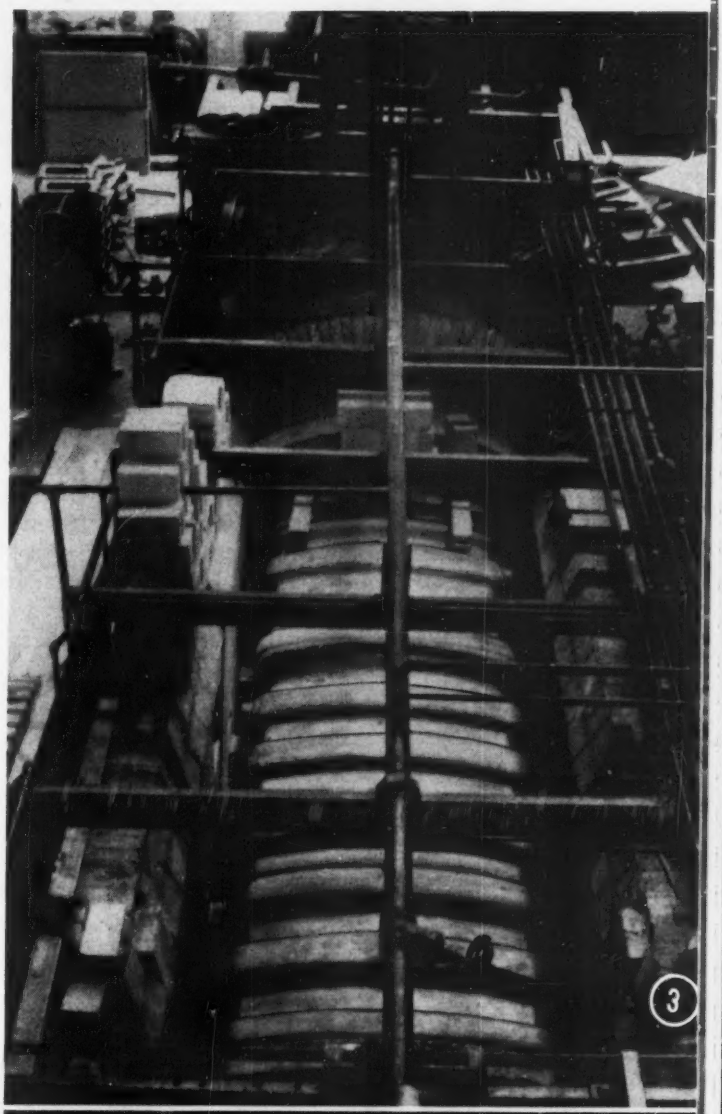
By W. H. HOLCROFT
Vice President and Technical Director
and
M. R. LARSON
Metallurgical Engineer
Holcroft & Co.
Detroit

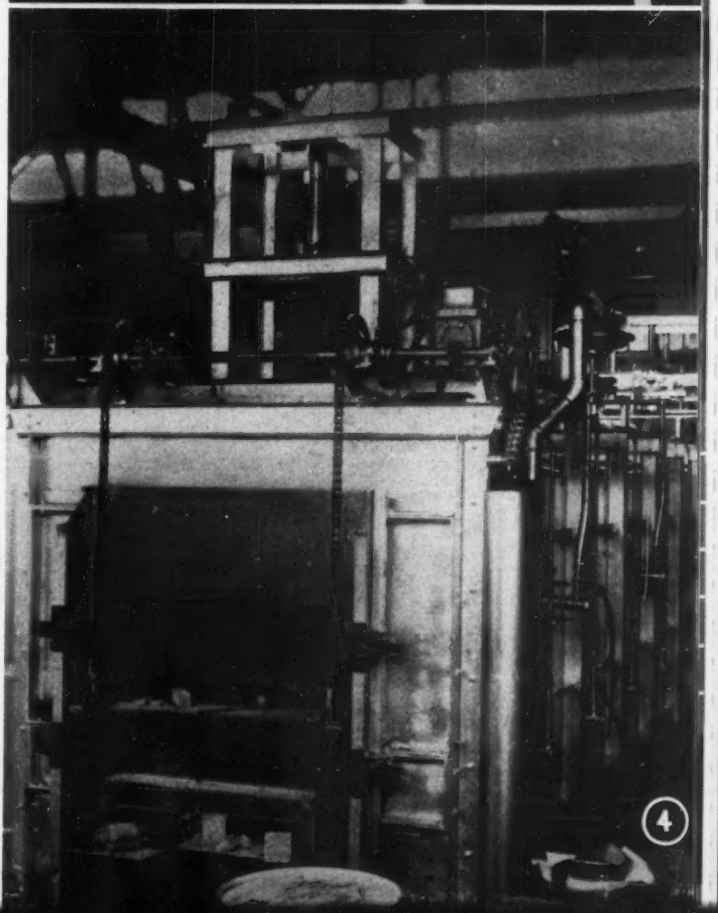
furnace operating temperatures and carry the work load. However, ceramic muffles were difficult to make gas-tight, and soon developed cracks with use. Advent of high-temperature alloys permitted more durable, gas-tight muffles to be built, and many furnaces of this construction are in use today. A typical muffle-type furnace is shown in Figs. 3 and 4.

Controlled-atmosphere heat treating proved so advantageous that a demand arose for furnaces of larger production capacity. Larger furnaces, in turn, called for larger muffles, which were unduly expensive. In addition to high initial cost, repair and replacement of the muffles required considerable time and labor, and necessitated complete shutdown of the furnace with resultant loss of production. Most muffle-type furnaces built today are smaller units having several small-diameter muffles instead of a single large muffle. With each muffle only a few inches in diameter, repair and replacement become more practical and complete furnace shutdown is not required.

Radiant-Tube Heating — Heating of controlled-atmosphere continuous furnaces by radiant tubes was introduced by Holcroft & Co. in 1936, and ended the limitations on furnace capacity imposed by high construction and maintenance costs.

With this heating method, instead of using a muffle to enclose the work, the heating medium is itself enclosed in small tubes or muffles which are inserted in a gas-tight work chamber. The work chamber is sealed at relatively low cost by welding the outer furnace case gas tight and by gasketing the expansion joints and working parts. The tubes may be heated by gas, oil or electricity, and the work is heated by radiation from the tubes. In low-temperature applica-





tions, forced convection of the furnace atmosphere can be used to supplement the radiant heating.

In addition to lower initial cost, radiant-tube heating provides an important reduction in maintenance costs. In the event of a tube failure, the individual tube may be quickly replaced without cooling the furnace. Radiant tube assemblies are fabricated from high-temperature alloy, the exact composition being determined by the furnace operating temperature.

Fuel-Fired Radiant Tubes—Gas is the most widely used heating medium, since it is readily available in most localities at reasonable rates. Most common gases for furnace heating are listed in the accompanying table. The Btu content per cubic foot of gas-air mixture is approximately the same for all of these gases.

With the present gas shortage in some areas, fuel oil has come into use as an alternate fuel. To meet this situation, Holcroft engineers designed a combination gas and oil burner which can be changed from one fuel to the other by means of valves at each burner. Using fuel oil, primary mix and secondary air velocities are controlled to provide combustion characteristics similar to natural gas. No vaporizing equipment is required, since each burner has its own atomizer.

For maximum combustion efficiency, fuel-fired radiant tubes require a luminous flame—commonly referred to as a bright, lazy flame. This is a low-temperature flame made luminous by glowing particles of carbon produced during combustion. Heat is transferred to the walls of the tube mainly by luminous flame radiation, with clear gas radiation playing a minor part. Convection heat transfer is small in fuel-fired tubes, since the burning gases travel through the tubes at low velocity.

First radiant-tube furnaces used straight-through tubes, with the burners on one side of the furnace and exhausts on the opposite side. In using a luminous flame with these tubes, the gases leaving the tubes had some unburned constituents. To increase the efficiency, U shapes, box shapes and W shapes were considered. After extensive experimental work it was determined that the U-shaped tube showed the best heating performance, and this is the type most commonly used today.

Design Determined by Experiment—Experimental work was carried out in a box-type furnace in which both a radiant tube and an electric heating element were installed. Various designs of both radiant tubes and burners were tested to determine the most efficient design of each.

For each test, the furnace was first heated by the radiant tube until the temperature came to equilibrium. For the different tests in each series, thickness of furnace insulation was varied to give different equilibrium temperatures; and by varying the amount of gas-air mixture supplied to the radiant tube, various theoretical rates of heat input were obtained.

In each case, when the furnace came to equilibrium temperature, the amount of gas required to maintain this temperature was measured by a gas meter. Gas and air were then shut off and the same furnace temperature was maintained by means of the electric heating element, which had variable power input.

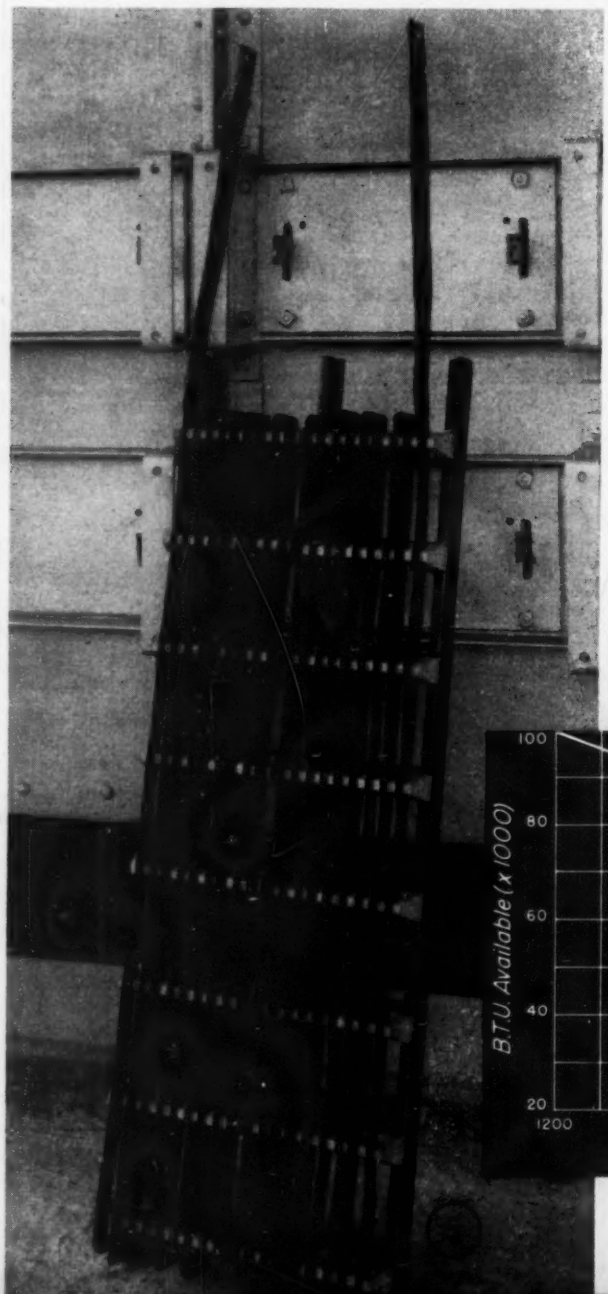
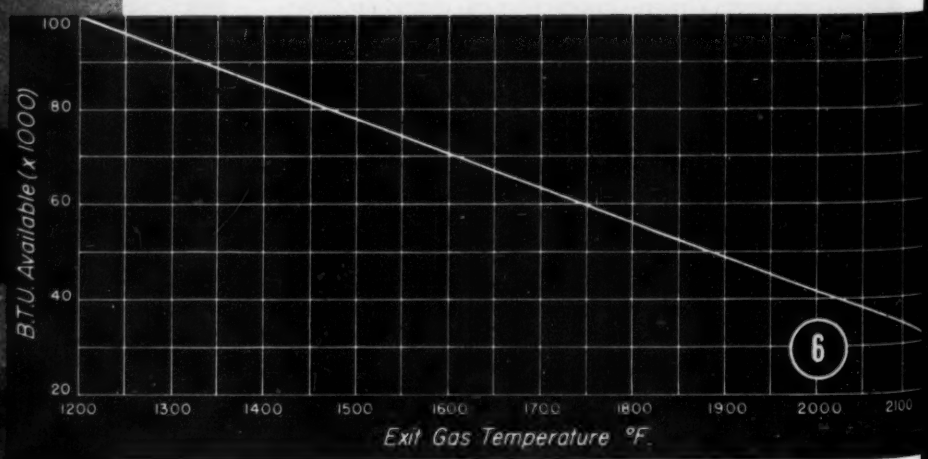


Fig. 5—Open-type Holcroft removable electric heating unit

Fig. 6—Btu available per gallon of fuel oil (144,000 Btu per gallon) vs. gas temperature

Fig. 7—Btu available per cubic foot of natural gas vs. exit gas temperature



Power required to maintain this temperature was measured to get Btu input, and from this thermal efficiency of radiant tube and burner was calculated.

Burner Performance Characteristics—The research work described above disclosed the operating characteristics of the burner required for maximum overall heating efficiency. These requirements are listed below, together with the burner design features by which the requirements are met:

1. To provide the long, luminous flame required, air and gas are introduced separately into the radiant tube, and are progressively mixed by diffusion as they pass through the tube.

2. Excessive turbulence causes "hot spots" (localized heating), decreasing the life of the radiant tubes. To avoid this, low gas and air velocities are used. Turbulence at the burner tip is especially undesirable; and this is controlled by regulating the relative velocities of air and gas.

3. Positive control of both gas and air is necessary to maintain efficient combustion. This is especially true when using high-hydrocarbon gases such as natural gas, propane and butane, which have an air-to-gas ratio of 10:1, 23.4:1 and 30:1 respectively. To provide this control, the burner is of closed-head design, and uses orifices to proportion the flow of air and gas and maintain the required air-to-gas ratio with varying rates of flow. Such a burner can be readily used with floating control.

A typical radiant tube installation with closed-head burners of type described is shown in Fig. 1.

Electrically-Heated Radiant Tubes — Electrically-heated radiant tubes are used in areas where power costs are very low. Major advantage of electric heating over gas or oil heating is that stack gases are eliminated. Heating units of this type consist of a coiled resistance element suitably supported within a straight tube of high-temperature alloy, Fig. 2. The heating element is totally enclosed by the tube to eliminate any possibility of carbon from the furnace atmosphere depositing on the heating element and causing a short circuit. The tube also protects the heating element against attack by sulphur—a frequent component of hydrocarbon gases used in the furnace atmosphere.

Other Electric Heating Units—Open-type electrical resistance units can be used for heating when the furnace atmosphere is sulphur-free and controlled to prevent carbon from depositing on the resistors and separators. Fig. 5 shows a unit of this type, designed so that replacement can be made while the furnace is held at operating temperature.

Another method of electric heating employs Globar resistors inserted transversely in the furnace chamber. This type of heating unit is used where temperatures above 1800° F are required. Alloy radiant tubes are not generally used for furnace temperatures over 1800° F, since the tubes would fail prematurely.

Limitations on Furnace Capacity — It is not uncommon for furnace operators to attempt to increase the production capacity of the furnace by increasing the heat input. While this can be done, it is not practical except perhaps in cases of emergency and for short periods only, for reasons explained below.

In the design of any radiant-tube furnace, the heat input is calculated on the basis of Btu per hour per square inch of radiant tube. The calculated value contains a reasonable safety factor to allow for control, for variations in furnace loading and for slight variations in heating value of the fuel (or variations in voltage when using electric heating).

Obviously, when an attempt is made to heat a greater volume of work, the heat input must be increased. This can be done only by increasing the radiation from the tubes—that is, by increasing the tube temperature.

With higher tube temperatures, less heat is available from the fuel, as shown in Figs. 6 and 7; for the exit gas temperature must be at least equal to the temperature of the tube. Furthermore, experience shows that when the rate of fuel input is much greater than that specified for the furnace, the fuel will not be completely burned in the radiant tubes, so that a fuel input even greater than theoretical will be required to maintain the desired furnace temperature. These two factors add up to a serious decrease in heating efficiency. In addition, the life of the tubes will be considerably shortened because of the excessive tube temperature required.

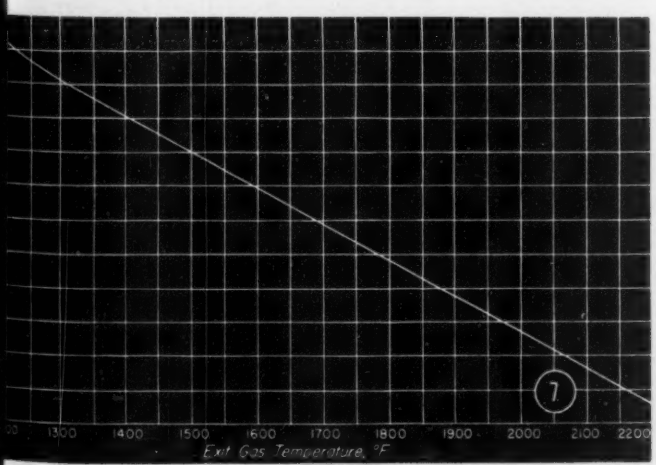
With electric furnaces, greater heat input can be obtained only by adding more heating units. Any attempt to increase the heat input by increasing the voltage across the heating elements will seriously shorten the life of these units. Incidentally, for this reason, in case of failure of a heating unit, it is far better to replace the unit immediately rather than "short it out" for any length of time.

Thus the only practical way to obtain an appreciable increase in the capacity of any furnace is to add more heating units. Where this is not feasible, the most economical procedure is to install an additional furnace, or to replace the existing furnace with one designed for greater production capacity.

PROPERTIES OF GASES COMMONLY USED FOR RADIANT TUBE HEATING

Cubic feet air required per cubic foot gas for complete combustion

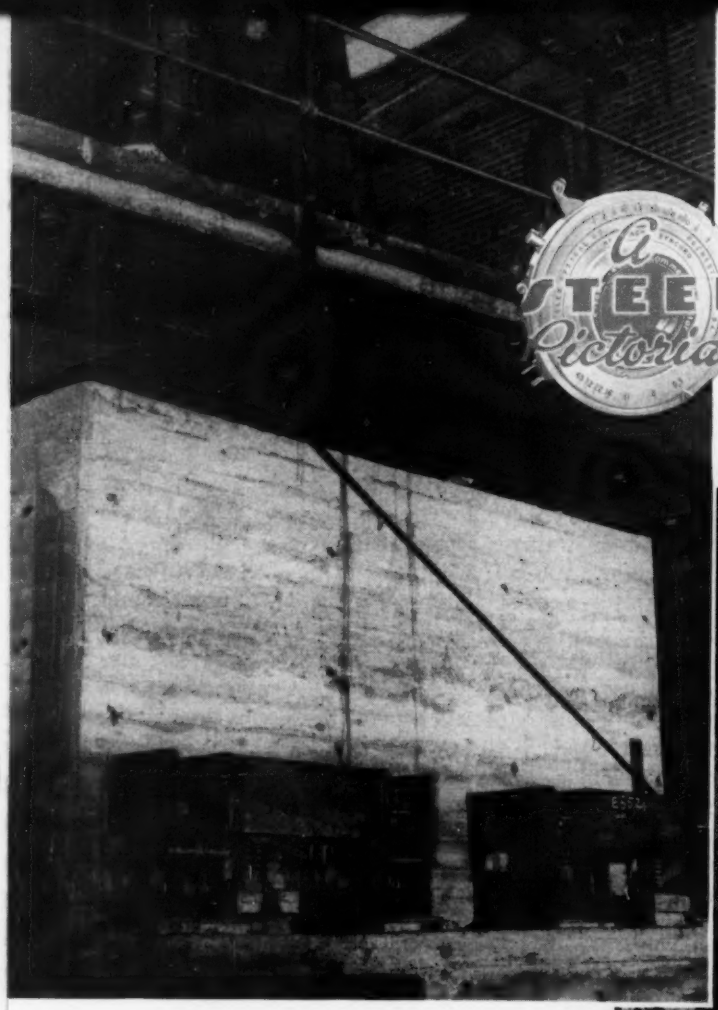
	Air-Cubic Feet	B.t.u. per cu. ft. Gross	Net
Natural Gas (Detroit)	9.68	1032	935
Comm. propane	23.4	2522	2331
Comm. butane	30.0	3261	3030
Mfd. gas (coke oven)	4.74	535	479



SMALLER VALVES USING

Drop Forged C

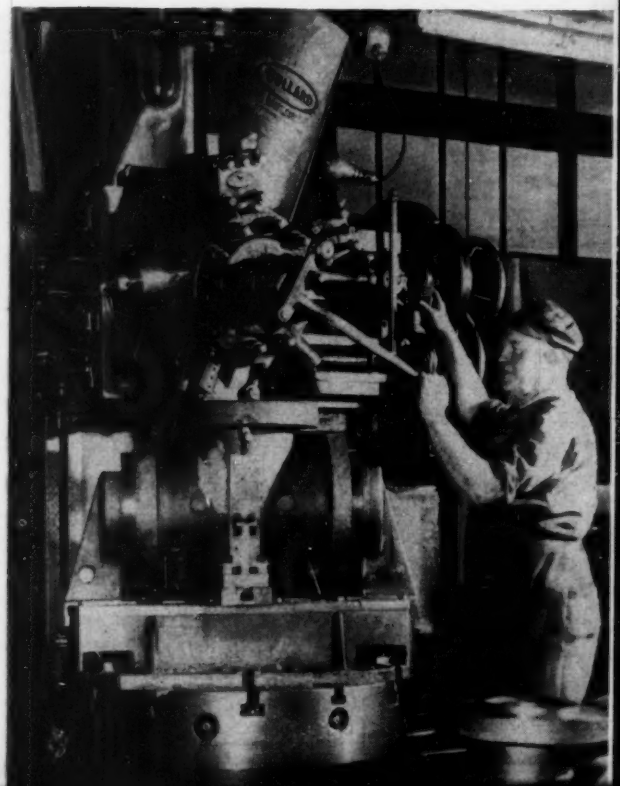
Accommodate Higher Temp

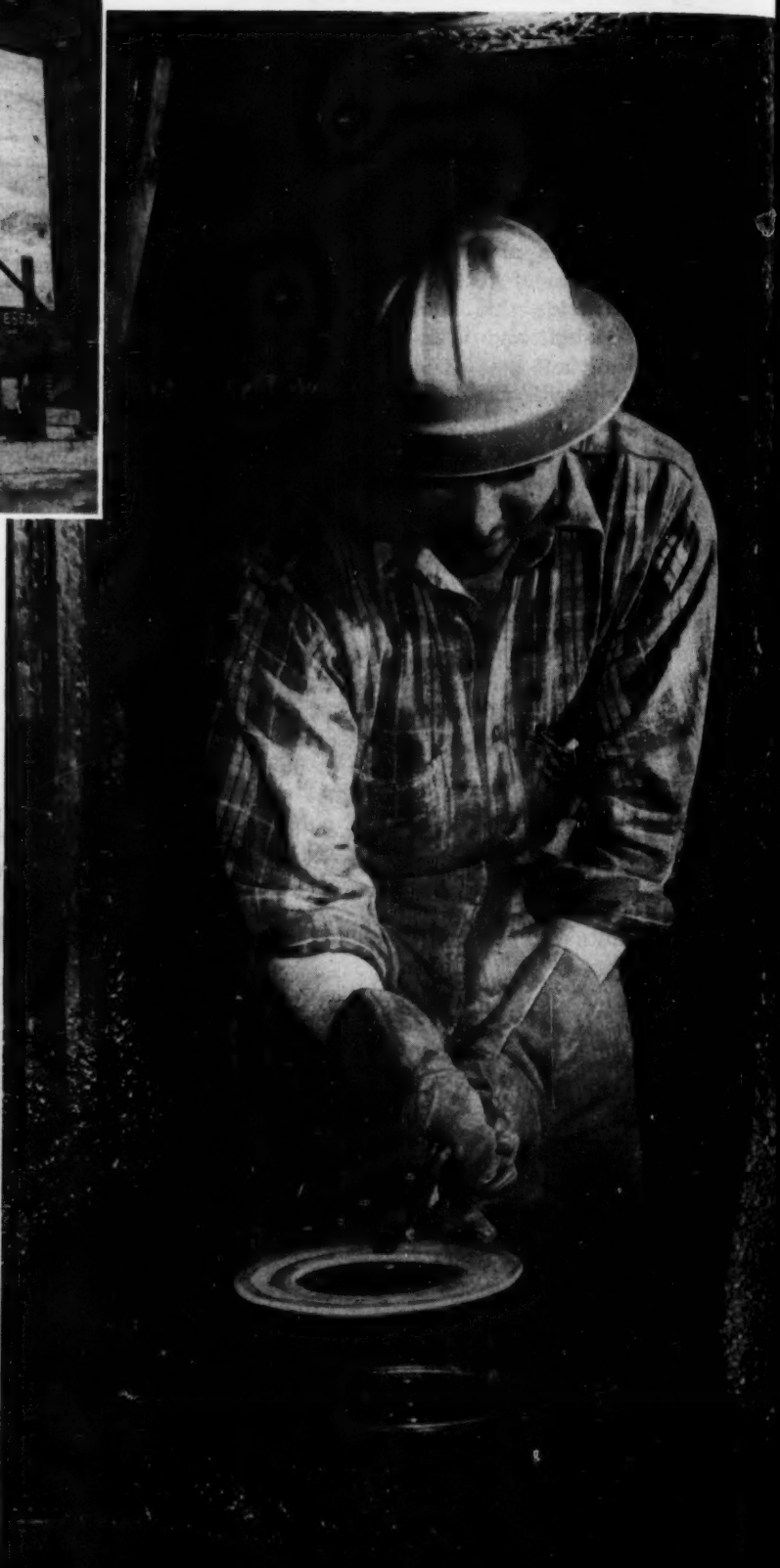


Above—130-ton floating base on which 2500-pound Erie drop hammer is mounted

Right—Removing stainless steel forged case ring from forging die under hammer

Below—36-inch Bullard vertical turret lathe machining the flange for bonnet connection on large cast steel valve body





By DAN REEBEL
Associate Editor, STEEL
Photography by the Author

edComponents

igher Temperatures and Pressures

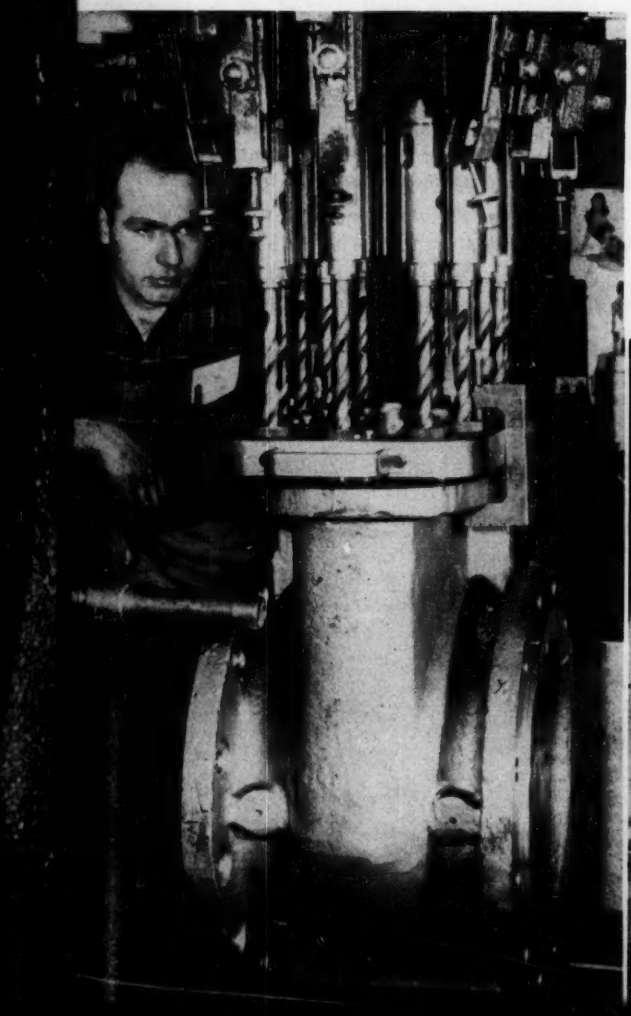
VARIOUS metalworking techniques, combined to form a completely integrated operation, are being employed by Ohio Injector Co., Wadsworth, O., in the production of steel, iron and bronze valves up to and including 600-pound units, which are available in gates, globes, angles and checks, with various types of trim in screwed, flanged and socket-welded styles.

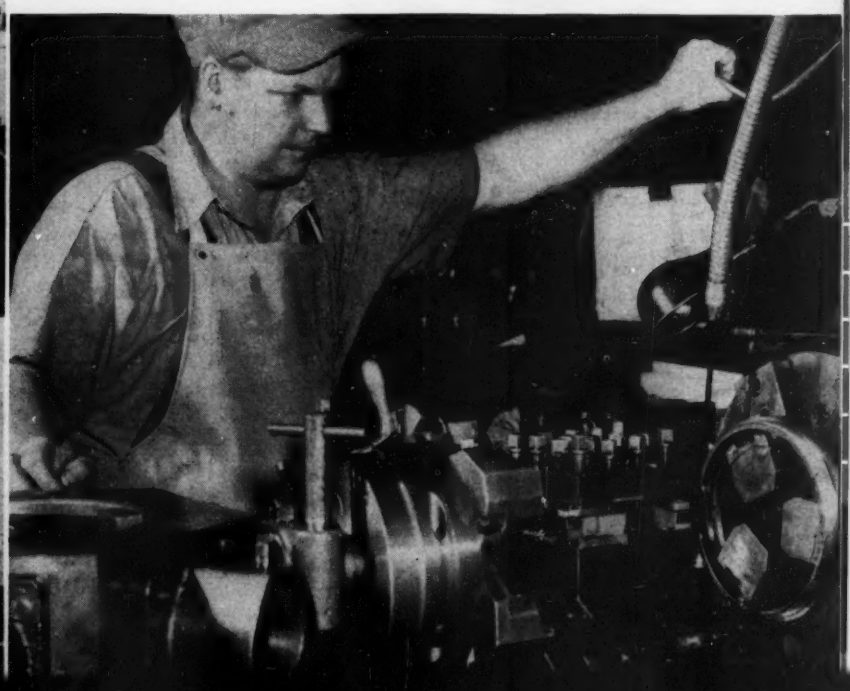
Valve manufacture begins with the fabrication of basic rough parts. While valves are often classified according to type of material of which their principal parts are produced, components of any particular type may be produced by several different methods—principally casting, forging, or machining parts directly from rod or bar stock. Thus, a cast steel valve may have cast alloy steel pressure-containing elements, forged alloy steel disk or wedge, and a stem machined from rod stock, one end of which has been forged to a particular shape for connecting with the disk or wedge.

Bronze, iron, steel and nickel-alloy castings are here produced by the sand mold process. After molten metal has solidified in the mold the castings are shaken out, cleaned and excess metal cut or ground off. They are then ready for machining.

Forged parts begin as "slugs" cut from rough bar stock. Being brought to a yellow heat, they are then hammered or pressed between hard steel dies containing impressions of the desired shape. Drop-forged parts enable today's higher temperatures and pressures encountered in the oil and power industries to be accommodated by smaller size valves. Forging increases the parts' corrosion resistance due to greater metal density and more homogeneous grain structure imparted in addition to overcoming blow holes and spongy spots. Recently installed is a 2500-pound capacity Erie drop-forging hammer for the production of many valve parts which until recently were secured from outside sources. The unit is mounted on a floating base which essentially is a 130-ton block of reinforced concrete 14 x 10 x 12 feet, being supported on 14 sets of nine 3-inch diameter springs. The hammer plus its supporting base aggregates 160 tons. Floating 1-inch above the ground floor line, the bottom of the base has not, to this writing, made contact during operation. Running through this massive block of concrete are eight 12-inch H-beams, the ends of which ride upon the spring sets. It is reported that this is the only such installation to be found in a commercial forging shop today.

Steel to be forged is preheated in an oil-fired furnace, designed and built by the company's engineers, which is automatically controlled plus or minus 10° F by Brown temperature control instruments. Raw material for the various forged valve parts is received in bar or billet form, ranging from ½ to 6-inch di-





Left—Jig-drilling the bonnet end of cast steel gate valve body on a multiple spindle drill press
Below—Turning finish and threading operation on stainless steel seat ring for cast steel valve before application to the body

ameter and being of carbon or stainless analysis in accordance with the customer's specifications. This material is stored within 25-feet of the drop hammer thus reducing to a minimum, amount of material handling required within the forge department. Drop-forged components produced for valves from ¼ to 2-inch inside diameter include the bonnet, body, gland stem and disk swing bolts. After trimming and cleaning the forgings are ready for machining.

Rod or bar stock for machining valve parts is commercially available in a variety of alloys and sizes, requiring no preparation other than cutting to proper lengths. Machining methods involved in producing valve parts vary somewhat depending upon the type part and its size. However, principal steps followed in making a cast steel gate valve are paralleled also in the production of forged steel cast bronze and cast iron valves of various designs. Following is a typical example:

Machining the cast steel body—largest component part—consists of facing and drilling end flanges which eventually are the pipe connections of the valve, similar operations on the bonnet connection flange, and threading of inside of the body for receiving renewable seat rings.

Machining of the bonnet or cover involves operations largely similar to those in producing the body—facing the bonnet flange, turning and boring the stuffing box and stem hole, drilling bolt holes—with the addition of a milling operation for facing flat pads upon which the valve yoke will be bolted.

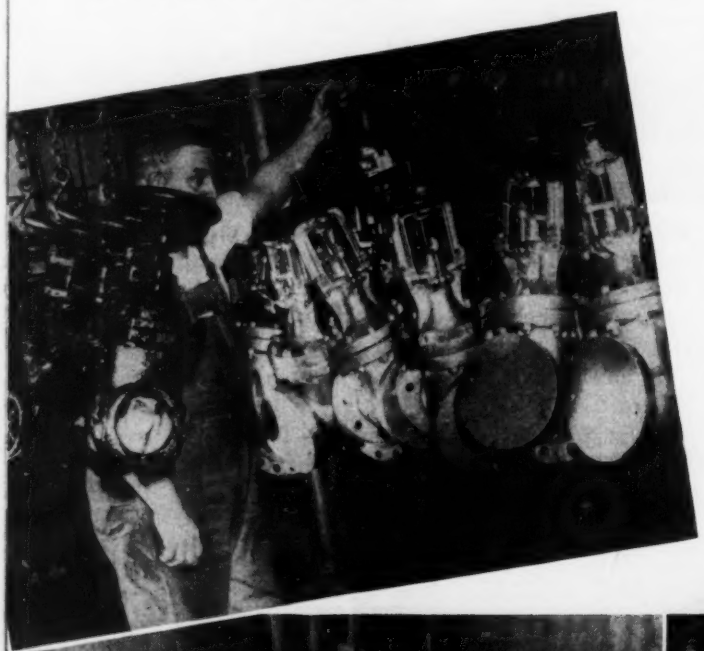
The wedge requires two milled slots down the side to guide its operation inside the valve body. Seat surfaces, which may be integral or welded-on, are first machined and then ground to a mirror finish.

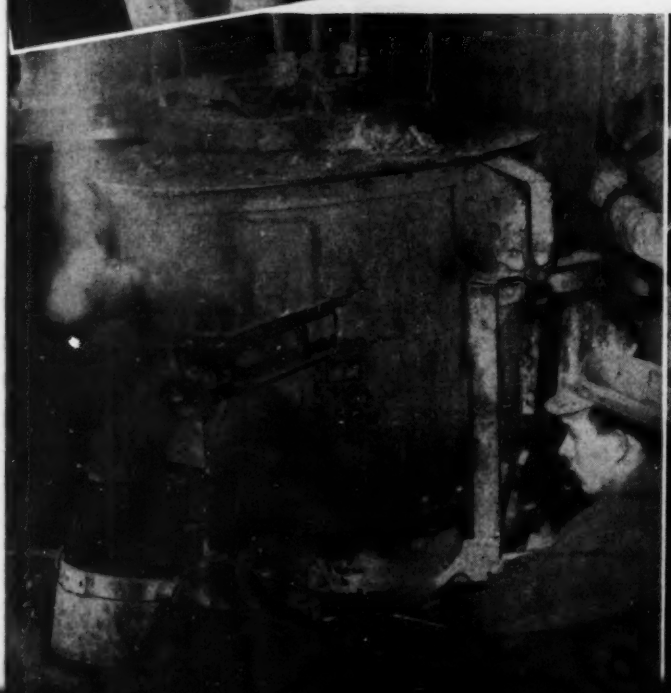
Seat rings are lathe turned, threads chased and both the front and back seating surfaces given a high machine finish.

Valve stem or spindle is a piece of round rod stock one end of which has been upset to form a T-head wedge connection. After the entire stem length, excepting the forged head, has been centerless ground the thread section is finished with an Acme form thread.

Remaining parts, the packing gland, yoke sleeve and bushings, are produced from castings or rod stock by turning, boring and threading. The cast handwheel requires only a single bore through the hub to provide a smooth fit with the yoke sleeve, while the forged gland flange requires no machining.

Differences in size and design between a small forged steel valve weighing two or three pounds and a cast steel valve weighing a ton or more result in a corresponding diversity in the size and kind of production equipment, manufacturing techniques and handling methods employed. However, the pattern remains the same—fabrication of the basic parts, machining, assembly and final testing. Component parts after finishing are assembled and the complete valve is hydrostatically shell tested at a pressure that exceeds its working rating to determine its soundness as a pressure vessel. Additional hydro-





Above left—Conveyor moving painted valves from spray booth to stock room. Aluminum paint is used for steel valves and asphalt paint for iron valves

Lower left—Pouring metal from electric melting furnace into ladle prior to casting into molds

Below—Pouring zone of bronze foundry, showing metal being cast into a group of weighted molds

static tests check the seat tightness.

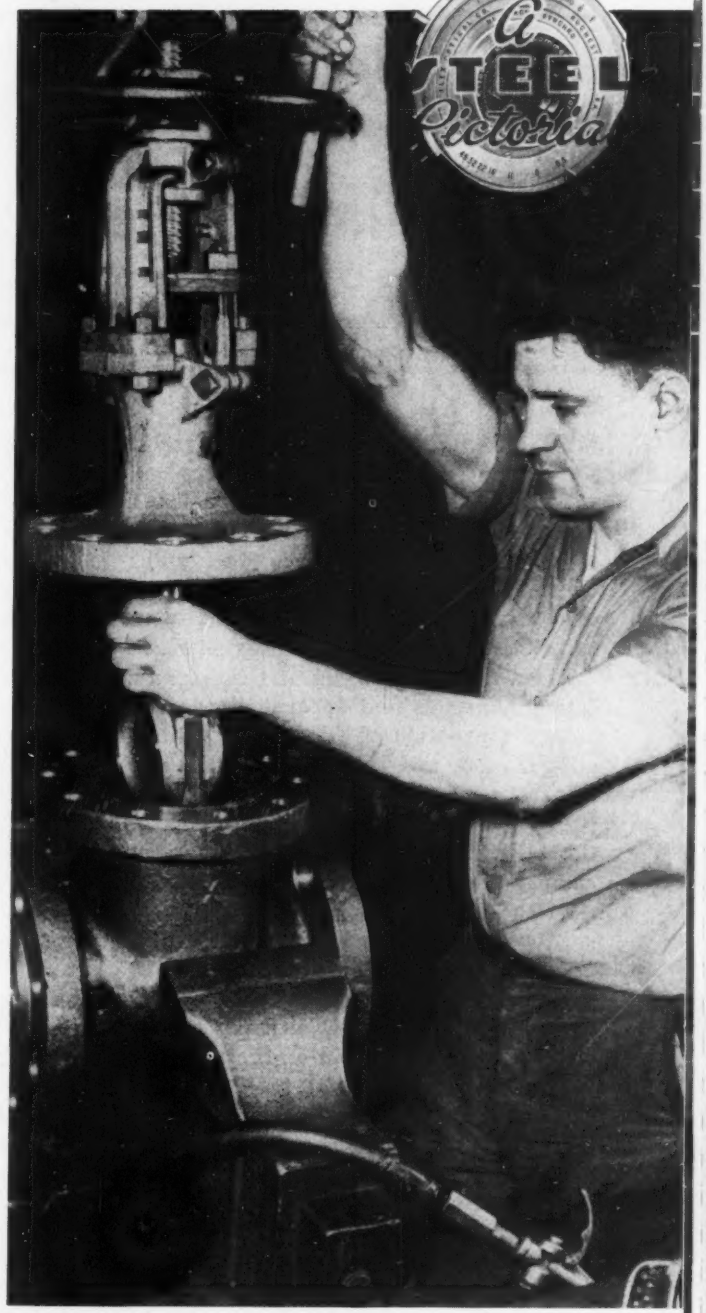
Final step is the application of a protective coating of paint; however, no paint is used on valves made of nonferrous or stainless materials. Iron and steel valves are given one coat by spraying. Asphalt paint used for iron valves gives good protection against all ordinary atmospheric corrosion elements, against the corrosion factors encountered when valves are installed underground and holds up well throughout the moderate operating temperatures in which cast iron valves are used. Aluminum paint used for steel valves is compounded to afford general corrosion protection at all temperatures used, that is, from ordinary atmospheric temperatures to 1000° F.

Constant chemical laboratory analysis of cast or forged material is utilized to guarantee adherence to approved specifications. Physical testing is handled by tensile testing equipment for determination of tensile strength, yield point, elongation and reduction of area, while hard alloy seating parts are checked on Rockwell equipment.

Gaging equipment includes plug, ring, and snap gages of many kinds, special gages to determine angularity and the relation of several finished surfaces each to the other.

Machining tolerances vary considerably depending upon the function which the particular part must perform and the service conditions under which the complete valve must operate. Torque-indicating wrenches are used in assembling the body-bonnet joint on high pressure-temperature valves in order to assure a predetermined bonnet gasket loading.

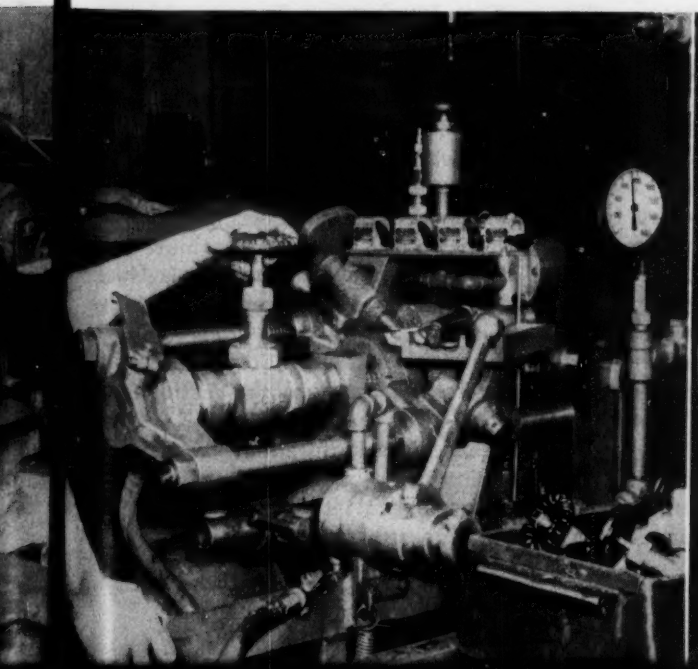
Throughout the above sequence of production—from foundry or forge to testing and packaging—the product is constantly subject to analysis, gaging and test for assurance of parts interchangeability, maintenance of quality, and adherence to users' and manufacturers' specifications.

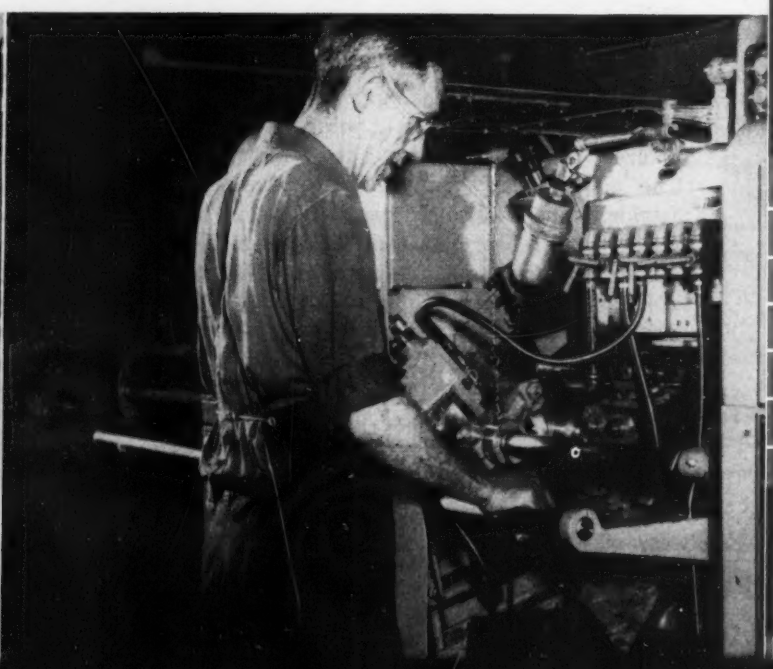


Above right—Assembling wedge and bonnet with valve body

Lower right—Machining valve parts from rod stock on Warner & Swasey multiple spindle automatic screw machine

Below—Hydraulically testing valve prior to packaging





Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

MEN OF LUBRICATION: Copy for this page this week was written at Hotel Statler, Buffalo, where I was initiated into a new brotherhood of engineers—those whose responsibility it is to keep the gears and shafts and cams and various other rolling and sliding elements of industry sliding, turning and rolling smoothly. This group now constitutes the American Society of Lubrication Engineers.

The technical program and the exhibition of lubricating materials and apparatus involved in the third annual convention of this young but highly important organization, and the caliber of the several hundred men attracted to Buffalo for this three-day convention, leave no doubt that the day of the oil can and the tallow pot as symbols of the technique of machinery lubrication definitely has passed into history.

In the so-called "good old days", one set of working drawings for a machine took care of everything. The idea of a separate layout for a lubrication system would have been laughed out of court. In many cases not even the location of oil holes was specified—that being left up to the men on the assembly floor.

Possibly that was not such a bad idea, if many draftsmen marked the location of as many oil holes in as many wrong places as I now realize that I did when I was "on the board" some 30 years ago. I put them where various machine design brochures told me they should go—but in view of what I saw in operating transparent plastics models at the Buffalo meeting, those brochures gave us draftsmen a lot of wrong information as to what happens inside a bearing.

One of the characteristics of success in engineering is ability to "unlearn" things. As time goes on, that ability becomes increasingly important, and lubrication engineering is a case in point.

Every engineering group has its "patron saint". The management group has its Frederick Winslow Taylor. The tool engineers have their Eli Whitney. From what I heard at the Buffalo convention of the lubrication engineers, I gather that the "patron saint" of that group in all probability is an English researcher whose name—Beauchamp Tower—sounds extremely romantic, but whose basic discoveries in the science of lubrication made more than 50 years ago were strictly down to earth.

BROADENED HORIZONS: Once upon a time—and well within my time—the machine tool industry was considered to be "narrow", in that it was made up of technicians rather than of engineers and men of science.

Admittedly there were exceptions, in figures such as William and Colman Sellers; Worcester Warner and Ambrose Swasey; and James Hartness here in America; and Henry Maudsley and Sir Joseph Whitworth in England. These men were scientists in the true sense of the word—even though they were self-trained scientists. They were exceptional men.

Today no such charge of "narrowness" can be leveled against the machine tool industry. This fact has been driven home to me at the third annual convention of the American Society of Lubrication Engineers in Buffalo.

As one who literally was brought up in the machine tool industry, I point with pride to the fact that of the 23 papers presented during that three-day meeting, three of very high caliber were presented by machine tool men—and one by a man who long has been closely identified with that industry.

This "role-of-honor" is made up of A. O. Schmidt and G. V. B. Sirotkin, Kearney & Trecker Corp.; Frank O. Hoagland, Pratt & Whitney, division Niles-Bement-Pond Co.; M. E. Merchant, Cincinnati Milling Machine Co.; and that "associate" and good friend, W. H. Oldacre, D. A. Stuart Oil Co.

No other single industry was so well represented on the program. No other speakers carried off their assignments any more creditably than did these men. All this is a significant sign-of-the-times which should encourage young engineering graduates to give serious consideration to careers in the machine tool business.

WHY IS THE FORUM CROWDED? Since 1936, I have ignored the first robin as the harbinger of spring and have substituted for that traditional bird, the welcome invitation which wings its way out of Pittsburgh and which announces another Machine Tool Forum sponsored by the Westinghouse Electric Corp. and the machine tool industry.

Great changes have come over this annual event in 12 years. In the spring of 1936 a mere handful of us who were interested in machine tool electrification gathered — by invitation of the Westinghouse management—in the assembly room of that company's office in East Pittsburgh. The object was a frank "give-and-take" discussion of what the machine tool industry needed and expected of the electrical industry—and vice versa.

Little did anyone in either group then dream that the Forum would develop to the point where mechanical, hydraulic and compressed air engineering would share the floor with electrical engineering; that the group of less than 50 would swell to one of more than 500; and that the day would come when electronic tubes would predominate over such "practical" things as pushbuttons in interest.

This year—just as last year—the Forum is held at Hotel Statler in Buffalo and at the big Westinghouse motor and control plant in that city.

The answer to that historic question, "Why is the Forum crowded?", is that a lot of men have gathered to discuss mutual problems in a friendly spirit — thereby reaching mutual understanding.

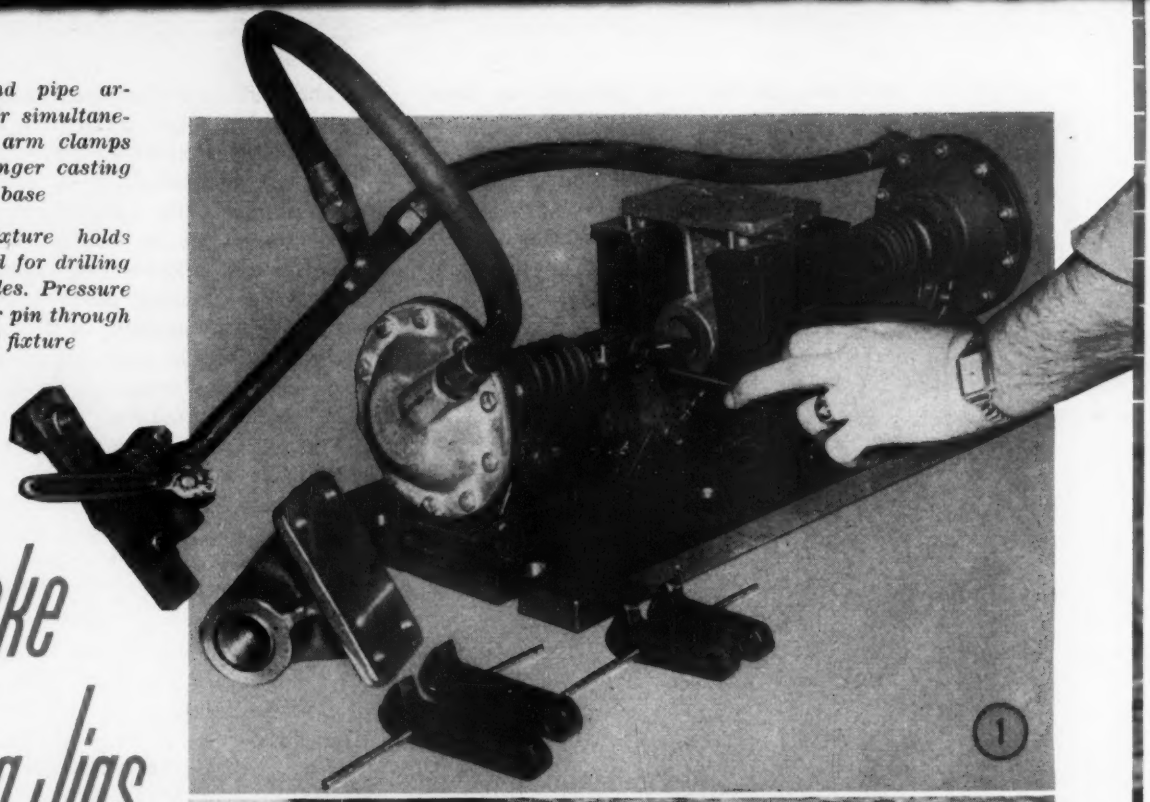


Fig. 1—Air-valve and pipe arrangement releases air simultaneously to both toggle arm clamps which hold spring hanger casting for milling of base

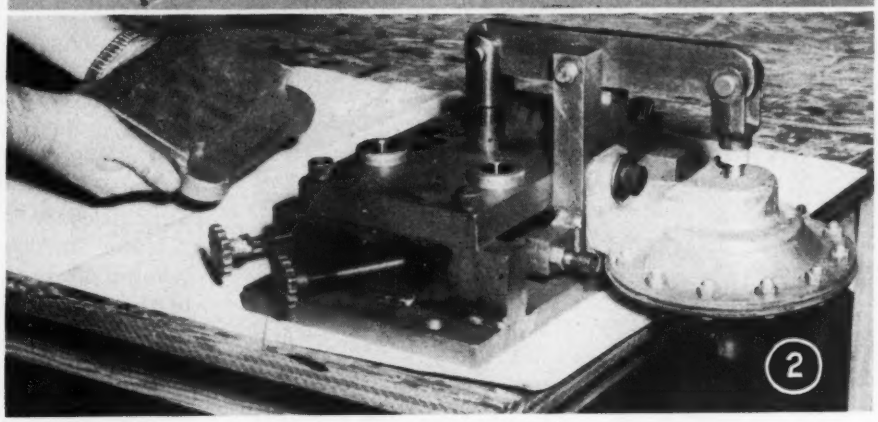


Fig. 2—Clamping fixture holds cast steel pressure pad for drilling of four 29/32-inch holes. Pressure is transferred to center pin through top and center of fixture

Air-Brake Clamping Jigs

SPEED MACHINING OF BUS PARTS

By WALTER RUDOLPH

Holders employed by Flxible need half the time usually required for setup by manual clamping. Other special parts devised by company toolmakers increase output and quality with existing equipment

INCORPORATING air-brakes as clamping power in a large number of jigs and fixtures, Flxible Co., Loudonville, O., cut machining time in half or better on parts for funeral car, ambulance and bus production. Several other production aids have been recently devised to improve output and quality of work.

In one instance, Fig. 2, four 29/32-inch holes are drilled in a cast steel pressure pad, 1½ x 5 x 7 inches. Casting is slid in one side of the fixture, and two adjusting screws take up on one of its sides, while two Allen set screws do likewise on the other. On the back side of the fixture is mounted the air-brake cylinder.

Rocking arm that pivots on a pin at the top of the cylinder mounting transfers the pressure to a 1-inch pin centered on top plate of the fixture. Operator positions the casting, makes side lining-up adjustments and throws an air switch to clamp the piece. Four positively located holes on the fixture top plate pass the drill. Formerly the operator required over twice the present drilling time for manual clamping, positioning of casting, etc.

Dual-End Clamping—Another fixture, Fig. 1, was devised with two air-brake clamps for milling a steel casting that is assembled on buses as a spring hanger. Casting is about 3 x 5-inches and has a large boss on one side. The other side must be milled flat. This fixture uses a 5 step inserted carbide-tip milling tool with 21-inches of feed at 545 revolutions per minute.

Flat side is up as the casting is placed against locating pins on the top of two heavy steel arms that are vertical to the base plate of the fixture. Boss hangs between the two arms, not quite reaching the base. Operator manually hooks two hold-down clamps in opposite ends of the boss hole.

Toggles on these clamps are brought to bear straight down on the sides of the boss hole when air is released to two air-brake cylinders mounted in line with the clamps. A single air valve releases air to both cylinders simultaneously, hoses being fastened to a T or right-angle improvisation on the end of the pipe from the air valve. Plant line pressure of about 90 pounds is used on this and other fixtures utilizing similar air-brake applications.

Off-center Fixture — Other types of fixtures that have cut machining time appreciably include one with a face plate and driver, Fig. 3, that enables close tolerances in boring and reaming one hole in relation to another prereamed hole on a gear shift control rod bearing box. It is a welded structure with 3 brass bushings in two tubes. The fixture is designed to take into consideration that the tube to be bored and reamed is out-of-line in the 2 x 3 x 5-inch box-like structure.

Fixture enables the operator to line up the tube with lathe tool which is an ordinary carbide tipped boring bar requiring no lubrication. Previously this work had been done on a drilling fixture, but conditions brought on by the structure's welded parts made for inefficiency. With the new fixture and any 14-inch lathe, scrap pieces are practically unheard of and tolerances are easily held. About 100 boxes can be done in 11 hours. The operator mounts the box on the face plate and centers the operation with Allen set screws.

Production Increase—Simple, portable deburrer was made that cut deburring time 600 per cent on rod ends. Rods are cut off to length in a screw machine and left with a slight tit that must be deburred. The improvisation consists of a ½-horsepower motor mounted on a wood base, in turn mounted on one end of a small board, the other end of which mounts an adjustable resting arm on which rods are held during deburring.

Motor revolves a coupled burr shank at 1725 revolutions per minute. Operator can hold a number of the rods in the left hand, while feeding individual rods against the burr shank with the right. Cost is only $1.25 about once a month for a standard ¾ x ¾-inch shank burr which is held in the motor shaft coupling with two set screws. Entire device is portable and can be carried easily by any worker to a convenient bench area.

Tapered Inserts—Company tool makers frequently make special parts for adapting shop machinery to certain operations that result in faster production and better quality work. In one instance, universal jaws were made for a Hufford bending machine eliminating need for separate jaw sets for every job. Essentially this involves different sizes of jaw inserts, Fig. 4, that fit into an adapter which in turn goes into the machine's chuck.

Taper machined inserts are easily placed in or removed from the adapter which securely holds the piece in the insert jaws when brought up tight. Six 4½-inch Allen bolts hold the adapter ring on the chuck.

Fig. 3—Off-center holding fixture is used to line up gear shift control rod bearing box for boring and reaming of tube that is out of line with prereamed tube adjacent to it

Fig. 4—Different sizes of tapered jaw inserts that fit into an adapter which in turn goes into chuck of Hufford bending machine. Two unfinished inserts in left foreground are designed for holding concave material

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Source of Sulphur Entering Steel Disclosed by

RADIOACTIVE TRACERS

Experiment points way to extensive use of marked atoms as a means of simplifying many manufacturing problems. May be employed in bessemer process to show end point of phosphorous during the blow. Other important applications of this new tool are presented

NEW phase in use of radioactive tracers for industrial research is indicated by the recent completion of the largest tracer experiment ever conducted, and probably the first using full-scale industrial equipment. Sponsored by the Republic Steel Corp., the experiment was conducted in its Cleveland plant by Arthur D. Little Inc. For over a decade, biologists and medical workers have used tracers. Although over 75 per cent are still used in biological work, their application in industry has increased greatly in the year and a half since the Atomic Energy Commission made many new kinds available at lower prices. Now that industrial workers are learning how and where to use the tracers they expect to solve many knotty research and control problems.

The recent study was one step in a program for keeping undesirable sulphur out of steel, and is typical of the instances where tracers are especially useful. Sulphur enters steel with the coke derived from coal, or with ore, limestone, scrap, or fuel oil. Some of it leaves the system in slag or flue gases, but some reaches the finished steel. In the finished steel, it cannot be determined which raw material supplied this element, except by tedious and inconclusive statistical correlation of sulphur content of the raw materials with that of the steel. This method showed coal to be the chief culprit, but steelmakers still were not certain which of the chemical forms of sulphur in the coal got through to the coke and then entered the blast furnace.

Two important forms of sulphur in coal are pyritic and organic. Since the forms change in the coke oven, there is no chemical method for learning whether the surviving sulphur in the coke came from the original pyritic or organic sulphur or whether low-pyritic coal or low-organic coal is the better raw material. If one of the forms is tagged with radioactive atoms, however, its travels can be followed precisely with radioactivity counters. In the present work, a small amount of artificial pyrites was made from radioactive sulphur and thoroughly mixed with 12 tons of coal, the normal charge to a coke oven. The proportion of the coke's sulphur which had come from the pyrites was then found by measuring the radioactivity of the element. This proportion was about the same as in the original coal, indicating that both forms are carried over to the coke equally, and that there is no advantage in buying coal with a low pyritic-sulphur content. More tests are planned to trace sulphur in other materials and chemical combinations through the steel-making process.

Other Uses of Tracer

Radioactive tracers have also been used in determining the concentration of toxic fumes in industrial plants, measuring the lubricant applied to textile fibers in amounts so small that ordinary measurements fail, determining the minute amount of metal transferred when a shaft rotates in a bearing, and studying the mechanism by which plants produce food from carbon dioxide, water, and other nutrients by photosynthesis.

Use of tracers to control industrial processes is being considered. As an example, radioactive phosphorus added to a bessemer converter would show when the last impurity, usually phosphorus, had been removed from the steel. Automatic controls could also be connected electrically to radioactivity-measuring instruments to turn down and shut off the vessel at the right time.

Research with tracers is characterized by directness and simplicity. Often, as in coke-oven work, the experiment can be run in full-scale equipment. This is important, for there is sometimes serious doubt whether a conclusion reached in the laboratory will hold in the plant itself. Radioactive materials from the atomic pile are not expensive. The sulphur for this study cost only about $50, compared with many thousand dollars prewar, when radioactive materials were made in the cyclotron. Better measuring instruments are available now, and more technologists are familiar with radioactivity. Since research using AEC tracers is made public, this familiarity is expected to grow.

On the other hand, not all elements have radioactive forms suitable for tracer uses. For example, radioactive oxygen loses about half its radioactivity every two minutes. Many important radioactive elements are not available from the atomic pile, and must still be synthethized in a cyclotron at much greater cost. The AEC restricts purchase and use of radioactive elements to protect the experimenter and the general public against misuse. The Commission considers the applicant's professional qualifications, the instruments available for safeguarding health, and the intended use. Requirements of the AEC reflects the danger possible with radioactive materials. A properly planned experiment should involve precautions such as the use of a minimum amount of active material, appropriate shielding, avoidance of inhalation and ingestion of the material, and safe disposal of all waste containing active materials. In the coke experiment, special precautions were taken, such as devising techniques to allow use of only small amounts of radioactive material.

The potentialities of the tracer method of research so far outweigh its restrictions, that its future is considered brilliant. Research directors are reconsidering many research projects, even those previously abandoned as impractical, to see if this new tool can be used.

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Supplementing aeronautical material specifications previously issued, 10 new specifications and 2 revisions of former specifications are being published by Society of Automotive Engineers Inc., New York. Specifications include those for cadmium plating, steel and alloy castings and steel sheet and strip.

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Over 60 Technical Sessions Highlight

1948 Foundry Congress and Exhibit

In Philadelphia May 3-7

"CASTINGS TODAY"—theme of the American Foundrymen's Association annual meeting of 1948, is to be exemplified at the organization's Foundry Congress and Exhibit, scheduled for May 3-7, in Philadelphia. Expected to be one of the largest shows in the 52-year existence of the AFA, the convention is returning to the site of its founding with a 5-day program of technical discussions combined with an extensive exhibit of foundry equipment, supplies and services by over 260 companies.

The all-time high attendance of 18,000 in 1946 is expected to be equaled or exceeded by those seeking the newest in techniques, practices and plant facilities for the production of highest quality castings at lower costs. Center of most of the activities of the meeting will be Philadelphia's Municipal Auditorium and the adjoining convention and exhibit halls.

Technical program will consist of 60-odd specific interest, round table, lecture and shop courses, "Information, Please" sessions, panel discussions and symposia. On Wednesday morning, May 5, officers and directors will be elected at the annual business meeting of the AFA.

Choice of the AFA nominating committee to succeed Max Kuniansky, present president, is William B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, present vice president of the association. Nominated for vice president is Edwin W. Horlebein, president, Gibson & Kirk Co., Baltimore, at present a

MAX KUNIANSKY
Vice president-general manager, Lynchburg Foundry Co., Lynchburg, Va., retiring president of AFA

WILLIAM B. WALLIS
Nominated association president, scheduled to take office in July

EDWIN W. HORLEBEIN
Nominated vice president, AFA

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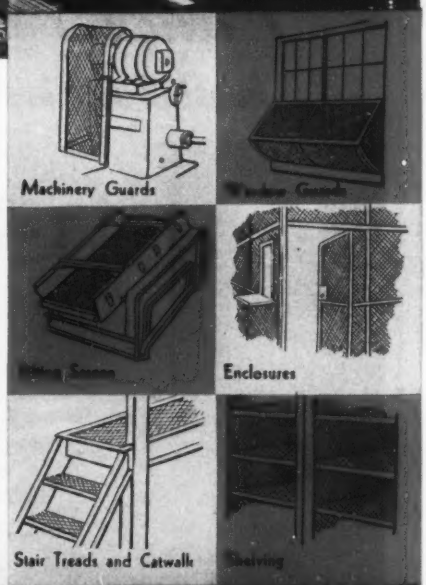

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director. These men are to take office in July.

Annual banquet will be on Friday evening, May 7, the guest speaker being Dr. Karl T. Compton, president of Massachusetts Institute of Technology, Cambridge, Mass. He will speak on "Team Play of Hand and Brain." The AFA gold medals will be presented at the banquet.

Among the papers to be presented are the following:

Monday, May 3—"Effect of Common Alloying Elements on Tensile Properties of Malleable Iron," H. A. Schwartz and W. K. Bock, National Malleable & Steel Castings Co., Cleveland; "Can Castings Be Engineered?", F. G. Tatnall, Baldwin Locomotive Works, Eddystone, Pa.; "An Approach to Quality Control in Casting Production," G. K. Eggleston and V. A. Simpson, Barnes Mfg. Co., Mansfield, O.; "Production Hardness Testing in a Malleable Shop," C. Schneider and L. Ulsenheimer, National Malleable & Steel Castings Co., Cleveland; "Ingot Metals vs. Virgin Metal," F. L. Wolf, Mansfield, O.

Tuesday, May 4 — "A New Permeable Metal Casting Plaster," K. A. Miericke and E. S. Johnson, U. S. Gypsum Co., Chicago; "Value of Pressure Tests and Radiographs of Gun Metal Castings," W. H. Baer, Naval Research Laboratory, Washington; "Test Procedures for Quality Control of Malleable Iron Castings," M. O. Booth, Central Foundry Division, General Motors Corp., Saginaw, Mich.; "Pearlitic Malleable Irons, Plain and Alloyed," D. J. Reese, International Nickel Co., New York, and Richard Schneidewind, University of Michigan, Ann Arbor, Mich.

Wednesday, May 5 — "Engineering Education," R. M. Brick, University of Pennsylvania, Philadelphia; "A Suggested Method for Determination of Coke Reactivity to Carbon Dioxide at Combustion Temperatures," H. E. Flanders, University of Utah, Salt Lake City; "Testing Refractories for the Foundry," S. M. Swain, North American Refractories Co., Cleveland.

Thursday, May 6 — "A Laboratory Evaluation of Some Automotive Cast Irons," A. B. Shuck, American Hammered Piston Ring Division, Koppers Co. Inc., Baltimore; "Fundamentals of Heat Treating Gray Cast Iron," A. Boyles, U. S. Pipe & Foundry Co., Burlington, N. J.; "Test Procedures for Quality Control of Steel Castings," J. W. Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa.; "Stress Relief of Gray Iron Castings," J. H. Schaum, National Bureau of Standards, Washington; "Conventional vs. Salt Bath Hardening of Cast Iron Cylinder Liners," G. Lahr, Detroit Engine Division, General Motors Corp., Detroit.

Friday, May 7 — "The Delayed Quench for Steel Castings," S. L. Gertsman, Bureau of Mines, Ottawa, Canada; "Electro-Chemical Cleaning of a Large Steel Casting—An Experiment," J. A. Wettergreen, General Electric Co., Schenectady, N. Y.; "Oxygen Enriched Cupola Blast," W. C. Wick, Armour Research Foundation, Chicago; "Development of Techniques for Quality Welding of Steel Castings," J. D. Wozny and E. L. LaGrelius, American Steel Foundries, East Chicago, Ind.

Philadelphia chapter of AFA will maintain a booth in the association's headquarters for scheduling of visits to plants in the Philadelphia area. A program of entertainment for ladies attending the convention also has been arranged.

Penton Publishing Co., publishers of STEEL, *The Foundry, Machine Design, New Equipment Digest and Revista Industrial,* will occupy booths 1007 and 1009 at the foundry show.

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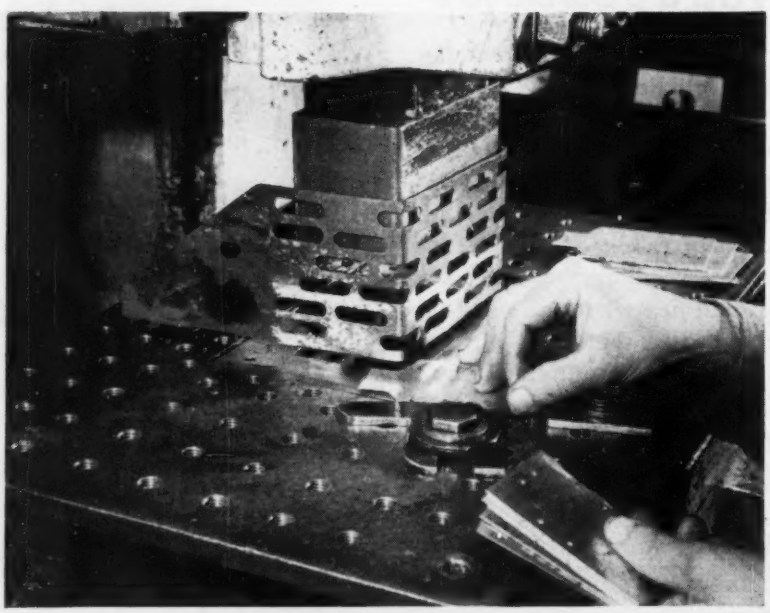
Low cost method of attaching rotor disk to spindle of electric meters by means of a lead base alloy with a low melting temperature kept liquid in a small gas furnace and fitted with a foot operated jet is described in one of four reports on manufacture of German industrial measuring instruments now on sale by Office of Technical Services, Department of Commerce, Washington.

Punch Press Output

. . . boosted with improved operating method



IMPROVEMENT in method of performing notching operations on a punch press at Glenn L. Martin Co., Baltimore, saves an estimated 2 hours per 8 hours of running time in addition to time saved in setting up machine. As shown in the accompanying illustration, an adapter plate and safety guard assure accurate work and protect the fingers of the operator.

Accurate work is obtained by fastening adapter plate to bolster plate with four dowel pins and four set screws. Prior to development of the present setup, plates had to be wired at one end to keep from shifting and a good deal of work was spoiled.

Safety guard is of slotted 4130 steel with a flange bent under and bolted to adapter plate. Faster production run of the parts is possible since the guard does not obstruct vision during operation and foot control is used instead of the slower two hand control that was previously required.

Welding Positioner Cuts Fabrication Costs

Brazing time of cooling coils for air conditioning and commercial refrigeration equipment at McQuay Inc., Minneapolis, has been cut by using a welding positioner made by Harnischfeger Corp., Milwaukee. Addition of a self leveling table on top for operator to stand on permits brazing all points without changing position as rotation and angle of tilt of coil can be controlled from table.

Pushbutton control is provided for all operations of positioner including power elevation of table which makes possible positioning operator as well as work. This exclusive feature saves time for operator and ends waiting for crane service as table may be raised or lowered with the work in place.

Steel Products and Uses Will Be Exhibited

Models, illustrations, cutaway sections and full scale samples of various steels and products made by United States Steel Corp. subsidiaries for use in the petroleum industry will be exhibited at International Petroleum Exposition, May 15-22, at Tulsa, Okla. One exhibit will show how readily stainless steel can be formed into sections frequently used in the industry with actual demonstrations of bending, forming and shearing stainless steel strip, bar and tubular stock, forming angles and other shapes and then bending them as might be required.

Tubular exhibit will illustrate and demonstrate application and properties of products such as drill pipe, casing, tool joints, oil well tubing, line pipe and refinery still tubes. A special feature will show underground gas storage units using 40-foot sections of 24-inch seamless tubing fabricated into containers which are manifolded for use in supplementing natural gas supply.

Wire rope and cables used in the petroleum industry and means for selecting suitable rope for an application will also be shown. Representative samples of various electrical wires and cables used around oil rigs and refineries will be included.

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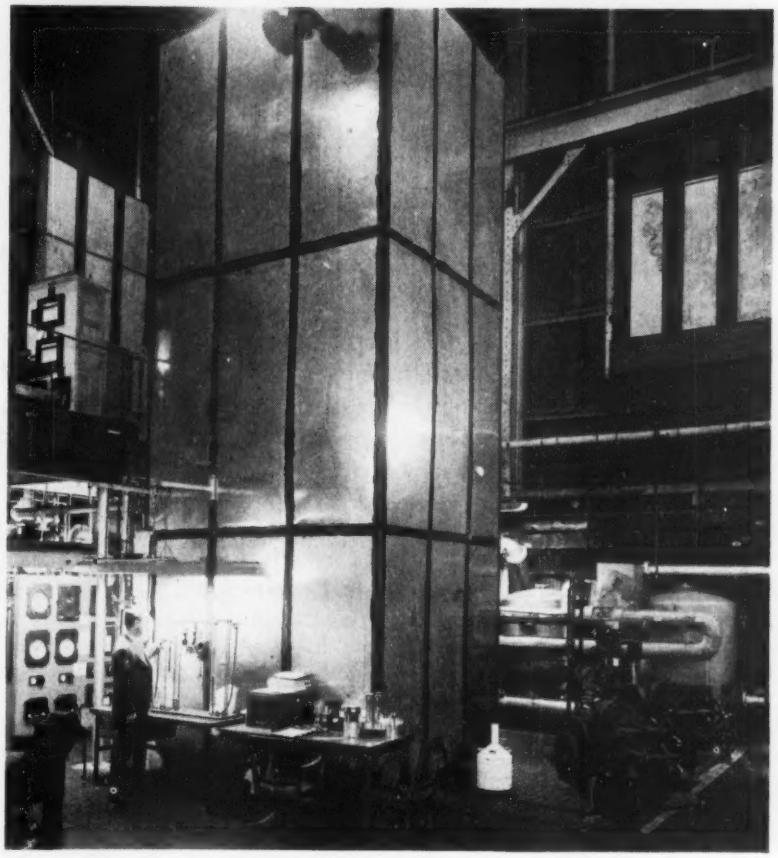
Simplified list of sizes and types of vises is established as a voluntary standard of practice according to an announcement from National Bureau of Standards, Washington. It covers following kinds of vises: Machinists, combination pipe, filers or toolmakers, sheet metal workers, heavy chipping and steam fitters.



Oxygen Pilot Plant

. . . foreshadows large scale commercial operations

COMMERCIAL oxygen plants which will produce more than 1000 tons of gaseous oxygen per day for the steel industry and synthetic gasoline processes are envisioned as the result of successful operation of a pilot plant producing 95 per cent purity oxygen by Elliott Co., Jeannette, Pa. More than 2 months of operation have proved that the plant shown in the accompanying illustration can operate indefinitely without periodic shutdowns for deriming in order to remove deposits of water and carbon dioxide.

Simple mechanical means of eliminating dangerous hydrocarbons from the system makes the process immune from possible dangers of acetylene explosions. Reversing heat exchangers pre-cool air to liquefaction temperature and at the same time freeze out water vapor and carbon dioxide. A reverse flow of effluent nitrogen every three or four hours removes the accumulated deposits.

Oxygen recovery rate from the air of over 97 per cent results in minimum power waste and the production of nitrogen pure enough to be used as chemical raw material or bright annealing in steel mills. Although it is possible to make higher purity oxygen, analysis has shown that it is more economical to make 95-97 per cent purity oxygen and to dilute the product as required for subsequent processes.

Process is a low pressure system in which air is compressed to about 5 pounds per square inch gage, conditioned and cooled to below minus 300°F to a single fractioning column in which complete distillation takes place only a few pounds above atmospheric pressure. Gaseous oxygen is boiled off from the reboiler and delivered at approximately atmospheric pressure after having been warmed up to room temperature in a heat exchanger.

Multiple Burners,

Oxygen and Compressed Air

IMPROVE STEELMAKING PRACTICE

Open-hearth operators describe methods employed to increase production rates and fuel efficiencies at National Open Hearth Congress. Blast furnacemen stress iron ore beneficiation and sintering plant design and operation. Attendance records reach an all-time high. Next year's meeting in Chicago

REGISTRATION at the thirty-first conference on the National Open Hearth Steel Committee and the Blast Furnace, Coke Oven and Raw Materials Committee of the American Institute of Mining and Metallurgical Engineers, Hotel William Penn, Pittsburgh, April 12-14, broke all records. Final figure totaled 1314 representing 1000 from the open-hearth group and 314 from the blast furnace group. Next year's congress will be held at the Palmer House, Chicago, April 18-20. C. R. FonDersmith, superintendent of steel production, Armco Steel Corp., Middletown, O., has been elected chairman of the Open Hearth Executive Board for the ensuing year.

Highlights of the various technical sessions of the basic open-hearth divisions follow:

Experimentation at South Works with the use of oxygen and compressed air in the open-hearth furnace has been limited to determination of their effects on furnace operations when used to promote flame development, according to M. F. Yarotsky, superintendent of steel production, South Works, Carnegie-Illinois Steel Corp., Chicago. He cited the following advantages:

1. Increased production rates over those obtained on the balance of the shop were realized in all experiments with higher firing rates provided the charging time for scrap was below two hours.
2. Use of high firing rates with or without compressed air or oxygen with protracted charging times or hot metal delays results in high fuel costs with little or no benefit in production.
3. Use of oxygen or preheated compressed air introduced below the oil with double burners resulted in the highest production rates as measured by tons per melting hour.
4. Economic advantage in the use of oxygen over preheated compressed air for flame development when used with a double burner may be difficult to justify, since the differential was not too significant.

Additional facts brought out by other speakers concerning the use of oxygen and compressed air in the open hearth were: Use of this gas has little effect on bottom delayed time. The heat time decreases under oxygen practice compared with ore heats. No improvement was noted in the quality of the steel under oxygen practice. Use of oxygen for desiliconization of blast furnace iron in the ladle greatly affects the lining and is accompanied by low yield.

U. F. Corsini, superintendent of steel works, American Steel & Wire Co., South Works, Worcester, Mass., in discussing the use of multiple burners and compressed air to improve operating rates of steel works furnaces mentioned that the second burner was installed in the same vertical plane about 18 inches above the lower burner. The former burner tunnel was increased in height to permit the insertion of the second burner which was so pitched in relation to the lower burner that the centerlines of the flames converged between the second and third doors.

After firing several heats with the two burners, it was learned that at any time that the scrap becomes nearly level it was necessary to resort to single firing or severe sweating of the furnace occurred, on the entering end.

Results of the initial test indicated an increase of 0.48 net ton per melting hour (5.1 per cent), 0.42 net ton per operating hour (4.8 per cent) and 1.54 gallons of oil per ton (4.4 per cent).

Compressed air is applied at the start of charging and left on until the scrap is well melted down. If it is left on any longer there is a tendency to freeze the bath. Normal operations call for the use of 75 to 100 pounds per square inch of air which is equivalent to 275 cubic feet of air per minute at 100 pounds pressure. The compressed air is not dried or preheated upon introduction into the furnace and the temperature of air at the furnace due to compression is approximately 200 degrees. The arrangement of the burner is relatively simple with the air being introduced through a 1-inch pipe positioned directly under the burner and the open end of the pipe is flush with the burner face. The air pipe is water cooled and, we have had no difficulty with its burning out. A single 1-inch Nickelson valve is mounted on the control panel and the air must be reversed by hand on each furnace reversal.

All furnaces have now been equipped with double burners and compressed air for combustion for a full year and there has been relatively little change in the method of operation established in the original trials. The net effect has been an increase in production rate of 15 per cent over the best previous years and is accompanied by a 4.0 per cent reduction in melting fuel. Data for 1947 show 9.7 net tons per tap to tap hour and 4,672,000 net Btu per net ton of ingot based on 104 net tons per heat. Improved production rates and fuel efficiency have actually reduced net wear of furnace brick through the burning of the fuel almost entirely on the hearth of the furnace. Increase in furnace pressure resulting from increased fuel input has also materially aided production rates and reduced fuel consumption.

In commenting on this particular paper it was brought out that double burners are effective where sufficient hot metal is not available. They also are responsible for from 5 to 5-1/2 per cent increase in the output of the furnace compared with operation under single burner practice.

Oscar Pearson, superintendent No. 2 open hearth shop, Carnegie-Illinois Steel Corp., Gary, Ind., in relating details of a test run of 34 heats using compressed air mentioned that the experiment was limited to 0.4 to 0.7 per cent carbon rimmed and mechanical capped grades. Compressed air, he explained, was used around

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the clock on each heat except when the air pressure was too low for effective results.

A group of 34 heats of the same grades without the use of compressed air, was selected for a comparison of heat times and production rates.

Extra heavy pipe 1-inch diameter in 20 foot lengths was used for lances which were inserted singly in No. 2 or 6 doors, depending on the direction of the flame, as longer pipe life resulted when the lances were inserted under the flame. Air pressure was 48 pounds per square inch. Ore additions were made at the normal time intervals and the practice was to insert the first lance at approximately 0.18 per cent carbon, usually immediately following ore addition. Two pipes generally were consumed per heat, although occasional heats required three and others only one.

A 9.6 per cent reduction in charge to tap time due to a 22.4 per cent reduction in melt to tap time was found for the heats made with compressed air, while production in tons per melting hour increased 10 per cent. Visual examination indicated a more normal rate of roof erosion, especially at the No. 2 and 6 door locations where the lances were usually inserted. An increase in frontwall and door lining erosion was also noticed.

H. L. Allen, assistant district manager, Republic Steel Corp., Buffalo, N. Y., in discussing Mr. Pearson's paper confirmed the importance of many factors which always cause considerable worry and sometimes tireless effort to the open-hearth personnel. With high-class-around-the-clock supervision and a close check on scrap charging practices, he stated, one of the most troublesome difficulties to many open-hearth shops can be aided materially. Such items as half-filled charging boxes, unnecessary determinents and careless switching service are too often tolerated in the day-to-day pressure of business.

In describing an experiment, which recently was carried on in an attempt to densify ordinary No. 2 scrap, he told of a car of scrap selected at random from a group of cars loaded from stock for the open hearth. After weighing, the car was shipped to one of the local dealer's yards for sorting and bundling. A crew of three men working with an overhead magnet crane separated the scrap on the ground as fast as it was spread. The entire operation of handling the carload was completed in 2 hours and 10 minutes.

Approved industrial engineering calculation shows the density of the scrap before handling was 853 pounds per charging box of 27 foot capacity. After processing the density was 1280 pounds or an increase of 50 per cent in the weight per cubic foot. A 7.5 per cent loss apparently due to dirt and rust in this handling, he stated in conclusion, is not particularly helpful to open-hearth yield in case of trouble.

At the refractories and masonry session various speakers brought out the fact that roof failures in the open-hearth shop may be caused by high alumina silica brick. Alumina, it was disclosed, lowers the refractoriness to a point which is unfavorable for the open-hearth roof. Silica brick of low alumina content stand up better than those of high alumina. The fuss of alumina in brick has caused a stir among refractories makers. New quarries have had to be brought in and washing equipment installed. Failure of a roof at one particular plant because of the actual radius of the roof running out of true form was remedied by the use of high alumina cement between the joints which was responsible for maintaining the radius thereafter.

Brickwork Spalling Eliminated

An Ohio operator in explaining his method for heating up a furnace after a rebuild mentioned the used two natural gas lines with two jets. When the rate of heating reached 75 degrees per hour the oil was turned on and after the furnace temperature exceeded 1200 degrees the crew opened up on the rate of heating. Hot metal was added after the furnace reached 1400 degrees and heats were obtained in 35 hours. By this method of heating spalling of the brickwork was eliminated and the use of wood in the original heat-up was avoided.

H. M. Kraner, ceramic engineer, Bethlehem Steel Co., Bethlehem, Pa., in speaking on the standardization of roof life of open-hearth furnaces announced the refractories committee of the American Iron & Steel Institute is engaged in the standardization of terms which would be helpful to a better understanding and comparison of refractory performance in various furnaces in the steel industry.

He stated a survey shows that 78 per cent of the open-hearth furnaces in this country use roofs having a thickness of approximately 13-1/2 inches. The specification for reporting roof life is summarized as follows:

1. Comparison shall be made on a basis of unit roofs plus all repairs made.

2. Repairs shall be reduced to terms of unit roofs or fractions thereof.

3. Unit roof is a 13-1/2 inch thick cover of any open hearth from knuckle to knuckle, or its equivalent in 9-inch equivalents (9 x 4-1/2 x 2-1/2 inch brick, 101.25 cubic inches).

4. Unit roof need not necessarily be a uniform thickness roof. It may consist of several thickness sections such as rib roofs, heavy shoulder sections, or other combinations. The volume of unit roof for any furnace is easily calculated as 9-inch equivalents or volume which value can be used as the divisor in determining the number of unit roofs during the campaign.

Mr. Kraner pointed out that the committee unanimously voted to accept the foregoing method of making roof life comparison in the future.

A. C. Moore, open hearth superintendent, Steel Company of Canada, Ltd., Hamilton, Ont., in considering open hearth with basic ends plus silica main roofs mentioned the following advantages:

1. From 5 to 7 per cent more production annually through reduced repair time.

2. A reduction in repair costs (labor and materials) of 3 to 5 cents per ingot ton on the end and slag pocket structure.

3. A reduction in fixed costs of approximately 5 cents per ton through increased production.

4. A reduction in tear-down costs at each repair due to the removal of less brick, and cheap and easy removal of granular, friable slag deposits, which also run over 50 per cent iron and makes a good grade of blast furnace sinter.

The tangible savings as just mentioned pay for the comparatively heavy initial cost of installation in a period of 2 to 3 years of operation.

Mr. Moore cited one disadvantage to the basic end structure—that of relatively high air infiltration due to the necessary expansion allowance. This undesirable feature, he said, has been largely corrected in more recent design.

In conclusion he pointed out that the essential requirements of basic construction for both ends and roof are:

1. Completely suspended structure.
2. Minimum of projecting corners or ends.
3. Joints tight enough to prevent hot gas penetration or cold air infiltration.
4. Metal encased brick.
5. Sufficient provision for expansion to prevent buckling without upsetting the conditions mentioned in item 3.

From a thorough inspection of refractories during the repairs of an all-basic furnace at South Works of the Carnegie-Illinois Steel Corp., Gary, Ind., the following facts were cited. In contrast to previous experience elsewhere with basic end

construction, the port ends and uptake areas were marked by rapid erosion and slag accumulation were somewhat fused and not as granular or as easily removable as has been reported from other installations. This is believed to have resulted from the high firing rates practiced on this furnace with the high temperatures and gas velocities involved. Roof construction, with minor modifications, shows considerable promise of being able to withstand a full campaign of 400 or more heats without patching. It was pointed out it will be necessary to modify end construction, as well as firing methods, to balance erosion of port ends and roof.

Blast Furnacemen Report on

CARBON BLOCK HEARTHS

PROGRESS reports on developments in beneficiation of low-grade iron ores and of more pretentious expanded programs soon to get under way keynoted discussions of the AIME Blast Furnace, Coke Oven and Raw Materials Conference held in Pittsburgh April 12-14. Closely tied in with prospect of more extensive use of beneficated tachonite ores, which will have to be sintered prior to use in blast furnaces, were a number of papers on sintering plant design and operation.

W. C. Bennett, assistant superintendent of blast furnaces, Carnegie-Illinois Steel Corp., Rankin, Pa., in explaining the "Use of Small and Large Blocks In Carbon Hearth Construction" pointed out that carbon brick bottoms are not as desirable from a structural standpoint as are block bottoms. Because of the many joints effective keying in of floor and walls cannot be secured. Double wall construction in conjunction with the use of large blocks, he contended, should make the block-type bottoms much stronger and safer from runouts than the brick type. However, use of granular carbonaceous material in the 4-inch packing space between the large block ringwall and hearth cooling staves seems a questionable procedure on these jobs.

Use of a carbon lined hearth does not affect the heat economy of the furnace to any serious extent. In fact on blowins after banking, the absence of a sizeable salamander should contribute to a saving of fuel required to bring the furnace back up to heat. Where one grade of iron continually is made for steelwork use, it does not appear desirable to bring the carbon floor any nearer to the tap hole than 4 feet. Entire hearth linings of carbon or fireclay are preferable to partial linings of either. He stated that although the company has experienced no trouble with the joint between carbon and fireclay brick located at cinder notch level, the experience of others seems to indicate the desirability of extension of the carbon lining to the tuyere level. It will be several years before we learn whether carbon bottoms are economically advantageous.

H. E. McDonnell, superintendent of blast furnaces and coke plant, Weirton Steel Co., Weirton, W. Va., indicated in his paper on "Design of Carbon Hearth and Carbon Tapping Hole" that there is much yet to be learned about the carbon hearth by manufacturer, blast furnace engineer, and operator. He stated that carrying the carbon in the crucible wall to the vicinity of the centerline of the tuyeres, or above the molten slag line, has distinct advantages in protection against cinder breakouts, but a satisfactory substitute for the bosh plates below the tuyeres is not so simple. "At Weirton, we feel that a happy medium is carbon to the bottom of the first row of bosh plates," he said. A straight, horizontal dividing line between the carbon and fire brick should be avoided. An offset joint, when properly designed and laid, should help minimize the probability of breakout trouble at this point.

R. W. Thompson, general works manager, Interlake Iron Corp., Cleveland, pointed out in his paper on "Design of Carbon Hearth At the Zenith Furnace" that the furnace has been in continuous operation for more than two years without trouble of any kind. There has been no breakout and there is no indication that the carbon lining is not still in place and intact. It is planned to reline two furnaces at other Interlake plants within the next few months and the same general construction as was used at Zenith will be followed in the use of carbon.

In describing carbon hearths in Republic blast furnaces, F. H. Janecek, blast furnace engineer, Republic Steel Corp., Cleveland, stated that four furnaces have double bottoms and double sidewalls and three have double bottoms and single sidewalls. A double layer bottom and single sidewall are being favored, and this construction will be followed in subsequent installations because it permits the use of a minimum number of blocks. Until such time as these bottoms can actually be inspected after being in service, all considerations of design must be purely theoretical.

Construction steps were outlined by E. H. Riddle, assistant superintendent, Blast Furnace Department, Jones & Laughlin Steel Corp., Pittsburgh, in his paper on "Construction of Firebrick Hearth and Operation of the No. 3 Furnace at Aliquippa," as follows: Masonry work and the firebrick were closely inspected. The hearth bottom was dried out with electric resistance strip while subsequent rows of hearth blocks were being laid. After the furnace was thoroughly dried out, it was blown in hot and limy. The slag charged in the blowin blanks was free of scrap. The hearth was not permitted to become cold by fast driving during the blowin period.

Maximum volume of wind was blown as soon as possible following the blow in period. The bottom of the furnace was sealed tightly when banked and close inspection of all cooling plates in hearth and bosh was made. Blowing out of cooling plates was done periodically whether the furnace was operating or banked. During slack-wind periods, this furnace was given normal full wind for a certain length of time, then fanned at 2 pounds pressure rather than cut down on the normal full wind.

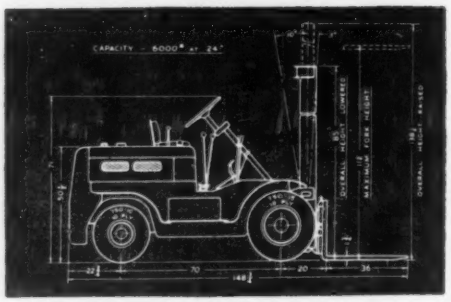
In blowing out for relining from mantel to top, the furnace was not blown down low. Scrap and miscellaneous materials in the burden were cut off at least 24 hours before the last cast. The furnace slag was leaned out at the same time. These precautions were taken to avoid a high bottom and to protect the hearth jacket from an expansion. As far as possible regularity in flushing and casting was maintained.

In discussing the subject of "Effect of Sized and Sintered Mesabi Iron Ores On Blast Furnace Performance," H. F. Dobscha, superintendent of blast furnaces, Carnegie-Illinois Steel Corp., Edgar Thomson Works, Pittsburgh, pointed out that the supply of better Mesabi ores is nearing depletion and that necessity for preparation of these ores is at hand. Comparative practical data, he stated, indicate economical and productive gains derived at blast furnaces from sized preparation of Mesabi ores are substantial. It is apparent that blowing equipment of sufficient capacity will be necessary to

MATERIAL HANDLING *News*

Here's **BIG NEWS!**

CLARK PRESENTS..... YARDLIFT "60"



a pneumatic-tired fork truck of 6000 pounds lift capacity, for the BIG jobs of handling the BIG, heavier loads under toughest, roughest conditions —a machine whose BIG-ness is matched by its BIG potential usefulness to Industry.

Does material handling in your business involve carrying heavy loads over rough, uneven, slippery surfaces, indoors or out?

HEAVYWEIGHT CHAMPION

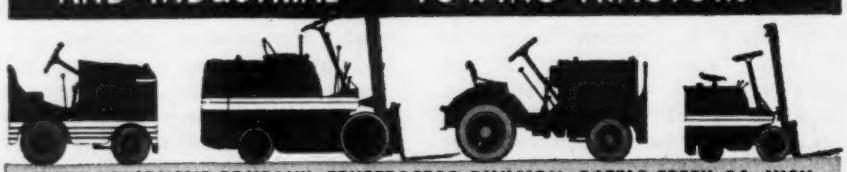
Here's the answer—Clark's YARDLIFT "60," for handling 6000-pound loads on pneumatic tires. This heavy duty machine completes Clark's pneumatic tired "team," developed during 1947—with the YARDLIFT "40" and the YARDLIFT "20," of 4000-lb. and 2000-lb. capacities respectively. Rugged, nimble, steady, these machines revolutionized and simplified many difficult handling operations, with sharp reductions of accidents.

DESIGNED FOR SAFETY

The YARDLIFT "60" has all the sound and practical features so conclusively proved by the performance of the YARDLIFT "40" and the YARDLIFT "20." Safety is of utmost importance in this field of handling; and the machine's two-wheel steering axle and dual-wheel drive axle with wheels widely spaced, provides maximum security. The pivoted steering axle mounting, a Clark development, enables the machine to carry its load evenly and safely while the tires follow smoothly the ups and downs of the ground surface. A special steering-gear ratio makes for easier operation; and the driver has a comfortable air-cushioned seat, easily adjustable and placed for good visibility.

That your business may enjoy these advantages, talk things over with a Clark field engineer, a man trained to survey your operations and to make unbiased recommendations as to the equipment that will serve you most economically. CONSULT CLARK.

CLARK ELECTRIC AND GAS POWERED **FORK TRUCKS**
AND INDUSTRIAL **TOWING TRACTORS**



CLARK EQUIPMENT COMPANY, TRUCTRACTOR DIVISION, BATTLE CREEK 26, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

realize full benefits from beneficiated burdens. Consideration should be given to hydraulic or other improved methods of screening from the blast furnace operator's viewpoint, as well as that of the ore producer. Poor furnace operation, he explained, occurred when the +20 mesh material and the agglomerates were substantially under 90 per cent. A large portion of the iron bearing flue dust was in the −20 to +40 mesh range, establishing that 20 mesh is a critical low point to consider in the preparation of iron ores.

H. K. Martin, consulting engineer Reserve Mining Co., Montreal, Wis., in presenting a proposed flowsheet for taconite concentration near Babbitt, Minn., pointed out that the magnetite of the east end of the Mesabi range must be crushed fine to free the particles of magnetite sufficiently from the attached gangue minerals to secure high-grade concentrate. By grinding to 85 per cent minus 325-mesh, a concentrate assaying 64.5 per cent iron can be produced with an overall magnetite iron recovery of about 90 per cent.

Arthur G. McKee Co., Cleveland, is designing a 200-ton-a-day pilot plant, which it is hoped will be put into operation this fall to determine whether the process developed at the Mine's Experiment Station for producing pellets or balls can be projected to a commercial operation. This project is being carried on under the direction of Oglebay Norton & Co., Cleveland.

Hydrogen reduction tests on hard substantial balls, which stand a great deal of handling without breaking up, indicate they have about the same reducibility as standard ore. If pelletizing can be worked out satisfactorily in the pilot plant, it should be safe to assume that a large plant can be built to do this work and a process considerably cheaper than sintering may be available for agglomerating fine concentrates.

Experiments on the breakage of coke was described in a paper prepared by H. H. Lowry and Benjamin Epstein, Coal Research Laboratory, Carnegie Institute of Technology, Pittsburgh. This work has indicated that conventional four-drop shatter tests and conventional tumbler tests are not sufficiently informative and should be replaced by tests that give information at more than one point. For shatter tests this means testing at a succession of drops (e.g., 1, 2, 4 and 8) and for the tumbler test it means getting information at various numbers of revolutions. These new tests enable one to determine a number of quantities measuring rate of breakdown.

DOES THIS NEW GRINDING & POLISHING UNIT GIVE YOU AN IDEA?

"Hill" 2-Roll Vertical Abrasive Belt Polishing Machine with cover removed.

HILL ACME TOOLS FOR INDUSTRY

Here is a totally new design in bar (or plate) grinding and polishing machines that may be used for an individual operation or assembled in multi-stage units for continuous finishing. "Hill" 2-Roll Vertical Abrasive Belt power driven feed or pinch roll type machines are now being used very successfully for line polishing of bars, plates or blanked shapes in the flat before forming. Typical installations at present include a line of 3 and 6 and 8 and 12 and 16 and 19 machines,—all synchronized as to feeds, speeds, etc. The proven results of this type of flat line polishing before forming has been astonishing,—both as to increased production and decreased costs. This type of equipment is offered in 6" multiple widths up to 60". "Hill" 2-Roll Abrasive Belt Grinding and Polishing Machines are also built in two other types; one for processing sheets of ferrous or non-ferrous metal, and the other for processing strip in coil form. Details will be cheerfully furnished for any of the three companion types of endless abrasive belt grinding and polishing machines for processing flat surfaces.

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"HILL" GRINDING AND POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

Annual Spring Meeting Reveals

METAL POWDER INDUSTRY

Makes Rapid Technical Progress

ALTHOUGH the metal powder industry is young in years, rapid technical progress and expanding acceptance of its product bespeak quick maturity. This appears inescapable, judging activity at the fourth annual spring meeting of the Metal Powder Association held at the Drake Hotel, Chicago, April 15-16.

Registered attendance at the meeting totaled 185, comprising producers of metal powders, producers of articles and parts made from these powders, manufacturers of equipment or supplies employed in the producing and consuming fields, and consultants and research workers in powder metallurgy. It was the first time the association has conducted a meeting outside of New York. As the conference was adjourned it was announced tentative arrangements have been made to return to Chicago next April for the 1949 spring meeting.

Officers of the association are: H. E. Hall, president, Metals Disintegrating Co., Elizabeth, N. J., president; S. K. Wellman, president, S. K. Wellman Co., Cleveland, vice president; T. L. Robinson, president, Wel-Met Co., Kent, O., chairman of the board; and Robert L. Ziegfeld, 420 Lexington Ave., New York, acting secretary.

Meeting activities consisted of two technical sessions and a luncheon. Conducted simultaneously was an exhibit in which 15 companies were represented with displays.

Sintering atmospheres used in powder metallurgy were discussed by Norbert K. Koebel, director of research, Lindberg Engineering Co., Chicago, who pointed out that application of the proper atmosphere is essential to obtain sintering. Powders will not sinter properly if oxides or other surface films are present. Function of the protective atmosphere, therefore, is to prevent oxidation at the sintering temperature and also to reduce any oxides that might be present on the powders when they were pressed.

Reducing atmospheres generally are used although vacuum may be employed. Vacuum sintering is costly, the speaker explained and, therefore, is used only on a small scale

Choice of a reducing atmosphere is dependent upon material to be sintered, initial cost of atmosphere generator, and operating cost of the generator. Mr. Koebel stated that pure dry hydrogen is an all-purpose sintering atmosphere and has the greatest reducing power of any of the protective molecular gases. High cost of cylinder hydrogen limits its commercial use. However, pure, dry hydrogen must be used for sintering alnico, stainless steels, or any alloy containing over 1 per cent or higher in aluminum. Where considerable hydrogen is used, it is advantageous from cost standpoint to produce it by cracking anhydrous ammonia over a heated catalyst at 1700° F.

Atmosphere in most widespread use in commerical sintering is the type produced by exothermically cracking city or natural gas with air to produce a gas containing about 15 per cent maximum hydrogen, 10 per cent maximum carbon monoxide, 4 per cent minimum carbon dioxide and the balance mitrogen, with a dew point averaging 70° F.

This atmosphere, the speaker said, is used chiefly to sinter low carbon iron powders, copper, bronze, silver, or nickel powders. Best results on nickel are obtained, however, with hydrogen or dissociated ammonia. Lean mixtures are used for copper, bronze and silver, whereas rich mixtures are used for steel and nickel.

Metal-ceramics, a new field in powder metallurgy, were discussed by Dr. Henry H. Hausner, consulting engineer and research associate, New York University, New York. Metal-ceramics refers to a process similar to powder metallurgy and ceramics. The products, sometimes called "cerametallic" materials, or "ceramals," are mixtures or other combinations of metal powders with powdered silicates, metal oxides, etc.

Present research in cerametallic compositions, the speaker asserted, covers two essentially different groups: Mixtures of metallic and ceramic powder, and combinations using different layers of metal powders and ceramic powders. Some of these mixtures are developed to form electrical semiconducting materials or electrical resistors. Other mixtures as well as some of the multilayer materials are developed to form high-temperature resisting, noncorrosive materials. Multilayer materials can also be developed for electrical products such as condensers, etc.

This development of cerametallic materials asks for special high-temperature controlled furnaces to sinter the formed compacts, stated Dr. Hausner. Ceramic furnaces have ample temperature capacity, but lack necessary atmosphere control. On the other hand, metallurgical controlled atmosphere furnaces do not reach the temperatures required.

G. Benjamin Smith, plant superintendent, Wel-Met Co., Kent, O., discussed development of a "Compressibility Factor" for metal powders. He pointed out that whereas there has been a large amount of standardization of testing methods in the industry, uniformity in testing compressibility of a powder or blend of powders is lacking. The company with which the speaker is associated sought to work out an improvement on present methods.

On studying pressure-density curves from reports by Jerome F. Kuzmick, Alexander Squire, and others, certain similarities were observed and a formula was derived covering those characteristics.

The speaker explained that the formula is empirical, and full explanation is lacking despite considerable research without satisfactory explanation. Nevertheless, results predicted by the formula as compared with experimental results were surprisingly close. Tests covered iron powder and three entirely different blends of copper base powder, and convinced users that the formula would prove valuable from a practical standpoint.

Efficient and economical tooling is a most important factor in the making of powdered metal parts since many more parts would be made if tooling cost was not prohibitive, observed Walter E. Dalby, president, Invo Tool & Gage Inc., Detroit. Standardization is important if tool-

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Sales of metal powder this year will at least equal 1947 shipments and perhaps exceed them, according to H. E. Hall, president, Metal Powder Association. Copper and iron, largest volume powders, totaled about 23 million pounds last year. About 15 metal powders are produced on a commercial basis. Powder production capacity, since the war, has increased at faster rate than consumption, but not all of this capacity is being used due to shortage of metals.

"16-25-6®"

. . . now the official trade-mark of the steel that made jet propulsion practical

THE United States Patent Office has granted The Timken Roller Bearing Company a certificate of registration covering the trade-mark "16-25-6".

"16-25-6" is the amazing Timken stainless alloy that retains high creep strength even under the extreme temperatures encountered in gas turbines. Until such a commercial metal could be found, America's development of the turbo-supercharger and jet propulsion was blocked. The Timken Roller Bearing Company produced the answer.

When used for turbine wheels in turbo-superchargers, "16-25-6" is heated by blasts of blistering gases that are as hot as 1700°F. until it actually *glows.* And it withstands these temperatures while spinning at 30,000 r.p.m.!

In addition to its astounding performance at high temperatures, "16-25-6" has excellent weldability and good forgeability and machinability.

As specialists in alloy steels, the Timken Company had the experience which made the development of "16-25-6" possible. We will be glad to put this same experience at your disposal in selecting the steel best suited to your individual needs. Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

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Fine Alloy

STEEL

and Seamless Tubes

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

TO anyone but a metallurgist, the nominal analysis of Circle L 22XM (table at left) may not look much like an "18 and 8" alloy. And yet it is the legitimate offspring of this famous family of corrosion resistant alloys which have proved their worth in hard, practical service for a generation.

Improvements in analysis, in heat treating, and in modern foundry practice make it a practical material whenever corrosion cuts into operating profits or threatens product integrity.

Circle L 22XM is one of several "18 and 8" Stainless Alloys which account for a high percentage of our electric induction furnace output. We will be glad to help select the right one for your purpose. Write for convenient reference chart.

LEBANON CIRCLE L 22XM

NOMINAL ANALYSIS

Carbon Max.	0.07
Silicon	1.25
Manganese	0.75
Chromium	19.50
Nickel	10.00
Molybdenum	2.25

NOMINAL PHYSICAL PROPERTIES

Tensile Strength	82,000
Yield Point	42,000
Elongation in 2"—%	50
Brinell Hardness	160

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In The Lebanon Valley"
ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

LEBANON ALLOY AND STEEL **Castings**
CIRCLE L

ing costs are to be kept at a minimum.

Many powdered metal parts manufacturers, the speaker observed, make the serious mistake of allowing new presses to be delivered designed to suit the press maker's style of tools. Since presses are purchased from various sources, the powdered metal parts manufacturer is confronted with the problem of tools suitable for one type of press or adaptable to other presses only by use of complicated adaptors which increase setup time. When new presses are purchased, the press maker should be furnished with a print showing basic dimensions necessary to accommodate the standard tools.

Iron powders in electronics was the topic discussed in a paper prepared by E. F. Swazy, L. S. Busch and A. M. Suggs, P. R. Mallory Co., Indianapolis, and presented by Mr. Swazy. It was pointed out that iron cores produced by powdered metallurgy are in wide use in the electronics industry. They permit design of circuits not possible without iron cores, increase efficiency, and make for smaller coils, which in turn results in more compact electronic equipment.

According to the authors, it is customary to use the largest particle size permissible to provide the electrical characteristics required. Powder is of highest purity consistent with lowest cost. The powders used in core production range from 15 cents to $2 per pound.

Use of porous metal powder bearings has increased tremendously in recent years and new applications still are being found, asserted D. S. Urquhart, development engineer, United States Graphite Co., Saginaw, Mich., in discussing the testing of such bearings. It is possible to predict what bearings and types will work in a given application because research of the bearing producer is done on machines used by the customer.

However, the speaker emphasized that more general information is needed on bearing testing. In his paper, he described two types of machines employed by his company in making tests, and presented test data derived from the machine.

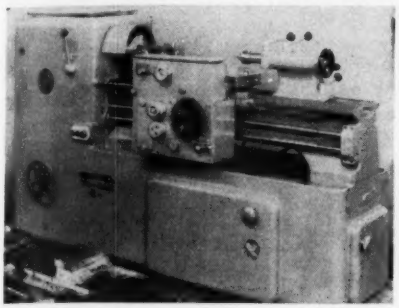
In the sintering of brass compacts, one is confronted with problems similar to those encountered in the solid metallurgy of brass, those normally encountered in powder metallurgy and in addition some peculiar to the powder metallurgy of brass. This was the comment of H. C. Miller, vice president, Charles Hardy Inc., New York. Some of the problems encountered were outlined.

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 142

1. Threading Machine

Spindle speeds from 200 to 3600 revolutions per minute, immediate stopping of spindle by means of brake and automatic declutching at end of operation are outstanding features of the Sentinel high speed threading machine made by Lees-Bradner Co., Cleveland 11, O. Maximum possible

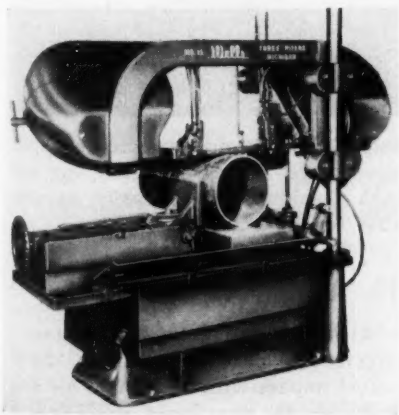


threading diameters are 4 inches outside diameter and approximately 6 inches inside diameter.

Included in standard equipment are a set of 20 change gears for pitch, set of 4 cams for thread lengths of 1 inch, 1-5/16, 2 and 2-5/8 inches for English threads, and one collet with bore to suit requirements. All adjustments required to set up on any particular component can be made in approximately 15 minutes.

2. Metal Cutting Saw

Heavy duty metal cutting band saw with automatic cutting cycle, electrically controlled blade pressure and self contained wet cutting sys-

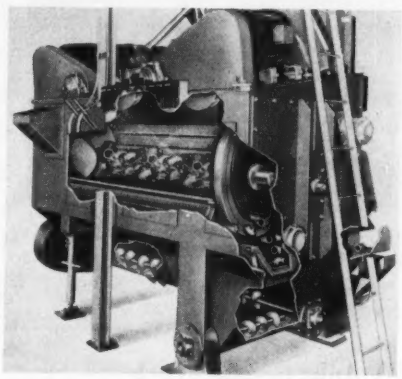


tem was recently announced by Wells Mfg. Corp., Three Rivers, Mich. Higher cutting speeds in feet per minute and increased blade efficiency are possible with wet cutting system.

Installed as an integral part of the saw, system includes a chip pan which is mounted between bed and base, fluid tank, centrifugal type pump-motor unit, splash guards and protective screens. Working capacity of system is 3 gallons of fluid.

3. Blast Cleaner

By utilizing combination of tumbling and longitudinal travel of work, continuous Tumblast announced recently by American Wheelabrator & Equipment Corp., Mishawaka, Ind., offers high production blast cleaning. No time is lost for starting, stopping, loading and unloading since



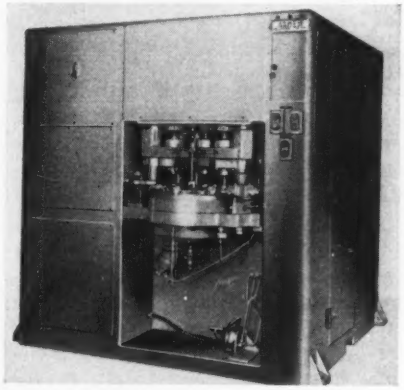
parts are fed into and discharged from machine in a continuous flow.

Work is carried through blast barrel on an endless apron type conveyor which constantly tumbles pieces exposing all surfaces to abrasive blast from overhead unit. Rate at which work progresses through cleaning chamber is regulated by tilting mill to proper angle by means of jack screws.

4. Special Machine

Pressures up to 8 tons are obtainable with individual adjustable cushioned strokes in a special hydraulic machine made by Agnew Electric Co., Milford, Mich., for assembly of one piece spark plugs which can also be adapted to progressive welding and forming operations. Type HCP3-5 machine incorporates a table that has six stations which index 60 degrees by means of a hydraulic motor. Speed of deceleration and acceleration of indexing is adjustable by means of a flow valve through infinite steps with individual pressure adjustment provided for each of three rams.

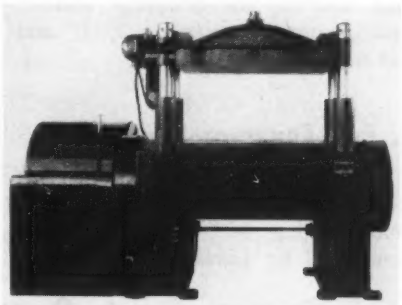
All pressure lines are mounted inside of tank to eliminate leaking of oil on outside of machine. Fast speed of rams and pressure up to



1000 pounds per square inch are made possible with a double volume pump driven by a 15 horsepower motor. Water cooling is provided for dies, punches, transformers and punch holder.

5. Tryout Press

Now being manufactured by Alpha Tool Works, 9281 Freeland Ave., Detroit, Mich., is a new 100 ton production type die tryout press which operates at 60 strokes per minute



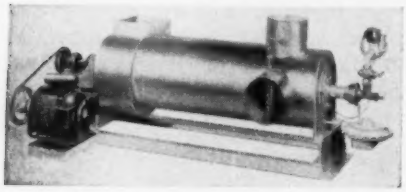
to give a true picture of actual production conditions. Head lifts out of position by electric control and inverts so that both members of die are accessible for finishing work without removing die from press. After finishing, head returns electrically to its original position.

It has a shut height adjustment of 4 inches from a minimum of 12 inches to a maximum of 16 inches. Machine rating is 10 horsepower with a V-belt drive. Clearance between

columns right to left is 44 inches.

6. Packaged Air Heater

Heater, fan, motor, drive, safety devices and temperature controller are included in the Midget utility air heater package, developed by Gas Appliance Service Inc., 1211 Webster Ave., Chicago 14, Ill. Direct fired



heater may be used for heating drying rooms and small industrial ovens, among other uses. Heating capacity is 125,000 Btu per hour. It is suitable for temperatures up to 350°F.

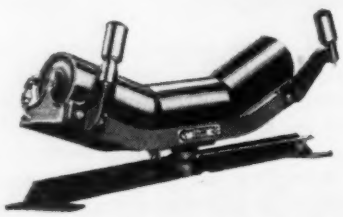
Bricklined combustion chamber affords complete combustion of gas. It has a good turn-down range, allowing proper temperature control. Fan capacity is 1000 cubic feet of air per minute. Hot air can be recirculated for fuel economy. Safety devices shut off gas in event of flame, power or fan failure.

7. Arc Boring Machine

Disintegration of broken taps, drills, end mills, reamers, screws, etc., is possible with the Electro Arc boring machine announced by Electro Arc Mfg. Co., 5930 Commonwealth Ave., Detroit, Mich. Machines can cut any size hole or any shape in any steel or metal including carbides, without changing temper of the metal. It will cut holes from 0.040 to 1 inch and up in diameter and in round, square, hexagonal, "U" and bar shapes.

8. Belt Conveyor Idler

Made in designs suitable for troughed, flat and return belts, new self aligning belt conveyor idlers, announced by Industrial Division of



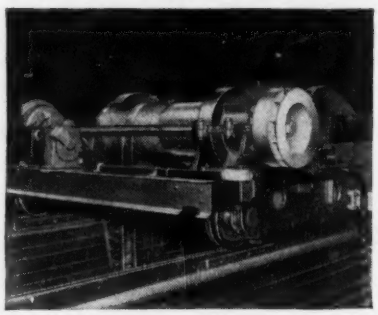
Continental Gin Co., Birmingham 2, Ala., are interchangeable with most standard idlers.

Features include heavy duty Timken bearings on the 1¼-inch swivel shaft, all grease pipes extended to one side for ease and safety of lubrication and hydraulic fittings as standard equipment. It is not necessary to cut into the deck plate to mount the troughing idlers.

9. Magnetic Brake

Crane control without mechanical load brake is possible with Magnetorque magnetic braking announced by Harnischfeger Corp., 4400 West National Ave., Milwaukee 14, Wis. Braking forces are exerted magnetically on the hoist motor which cannot be energized until the magnetic braking unit has been excited.

There are no rotating mechanical



parts in the unit. Wear is eliminated since there is no friction or metal to metal contact thereby making unit good for life of the crane.

10. Low Height Truck

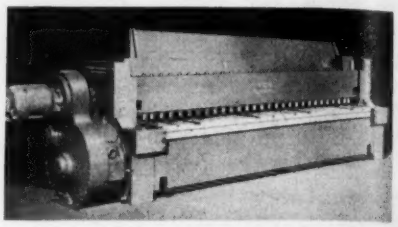
Introduced by Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa., is a new light weight, low capacity Zephyr lift truck which has a short 68-inch mast to enable its use in truck trailers, freight cars, etc. The mast has a telescopic extension to permit high tiering after entering through a low door.

Trucks are built in capacities of 1000, 1500 and 2000 pounds. Each measures 58 inches long and 38 inches wide. They have a tilting mast, four forward and reverse speeds, spur gear drive and sit-down control.

11. Squaring Shears

Rectangular box section bed and triangular box section cross head for rigid knife support, feature the No. 1214 heavy duty, underneath drive squaring shears announced by Niagara Machine & Tool Works, Buffalo 11, N. Y. Rated capacity is ⅝-inch mild steel, 14 feet long. Hold down, driven by eccentrics on the heat treated crankshaft, needs no auxiliary operating mechanism. Spring loaded feet clamp metal during working part of cycle and automatically compensate for metal thickness variation.

All rotating parts including the 14-point engagement sleeve clutch, heat treated gearing and connections are



totally enclosed and operate in an oil bath. The parallel ball bearing self measuring back gage can be arranged for either manual or electric operation.

12. Fork Truck Cab

Tructractor Division of Clark Equipment Co., Battle Creek, Mich. is introducing a welded steel, sound insulated, all weather cab for use on its Yardlift-40 pneumatic tired fork truck. Cab is fully enclosed with door on the driver's side. Rearview mirror and windshield wiper are standard; a hot water heater is extra equipment.

Truck cab has sliding windows,

safety glass throughout and an upper window of glareproof glass to aid high stacking. It is easily mountable for field installation.

13. Air Impact Hammer

A bench type production hammer which provides 1 ounce to 12,000 pound impact with 100 pound air line pressure is announced by Bryant Products Distributing Co., 297 West Michigan Ave., Jackson, Mich. Tool uses "exploded air" principle in which air under high compression is equalized on both sides of piston, then the air below is exhausted suddenly, resulting in the blow. Hammer may be used for light stamp-

(For more information use the card following page 142.)

Complete trolley for overhead conveyor. Each trolley consists of two wheels and two brackets. Both wheels and brackets are TOCCO-hardened. *(Photo courtesy Link Belt Co.)*

HARDENING COSTS CUT 75% with TOCCO* Induction Heating

• This TOCCO-hardened conveyor trolley bracket may be a long call from *your* product, but its case is typical of the savings accomplished by induction heating of metal parts of all sizes and shapes. Note these advantages:

1. CUTS COSTS—Hardening cost per bracket has been cut 75% by the adoption of induction hardening. Present cost is just one-fourth of cost when conventional hardening methods were employed.

2. STREAMLINES PRODUCTION—TOCCO eliminates carburizing, hauling and sandblasting—can be placed right in production line, next to related operations.

3. IMPROVES PRODUCT—TOCCO hardens wearing surface only—thus preserves original toughness and ductility of remainder of part.

TOCCO Engineers are glad to explore your operations for similar cost-cutting improvements—without obligation.

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*Trade Mark Reg. U. S. Pat. Off.

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Please send copy of "TOCCO Hardening".

Name_____

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City_____ Zone___ State_____

● Horsburgh & Scott spur gears are rugged and dependable, built for industry's hardest tasks . . . they stand supreme in quality of materials and workmanship. You'll find proof in their performance and long, uninterrupted service.

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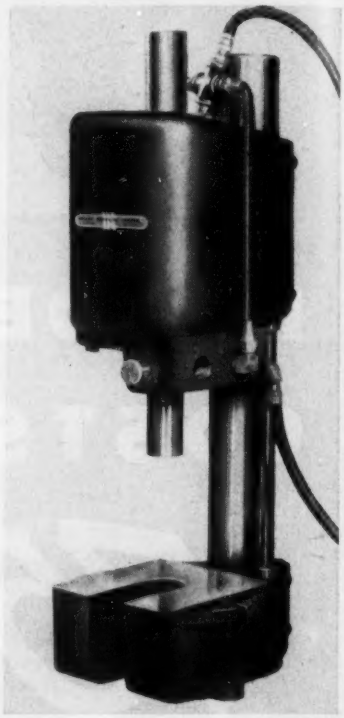
GEARS AND SPEED REDUCERS
5112 HAMILTON AVENUE • CLEVELAND 14, OHIO, U. S. A.

ing and forging, trimming, crimping, riveting, piercing, etc.

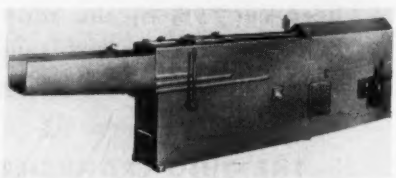
Impact pressure may be varied precisely up to the press capacity. Pressure is the same at any point in the stroke. Housing and base are semi-steel castings and post is seamless steel tubing. Wearing parts are



chromium plated. Bench height is 27 inches, area 6½ x 11 inches, stroke 3 inches and distance from ram to column, 3¼-inches. Speed of operation with hand or foot control is about 60 strokes per minute.

14. Broaching Machine

Features of the 6, 10, 15 and 20-ton capacity horizontal hydraulic broaching machines with 54-inch stroke, announced by Acme Broach Corp., East Third St. at Delaware,

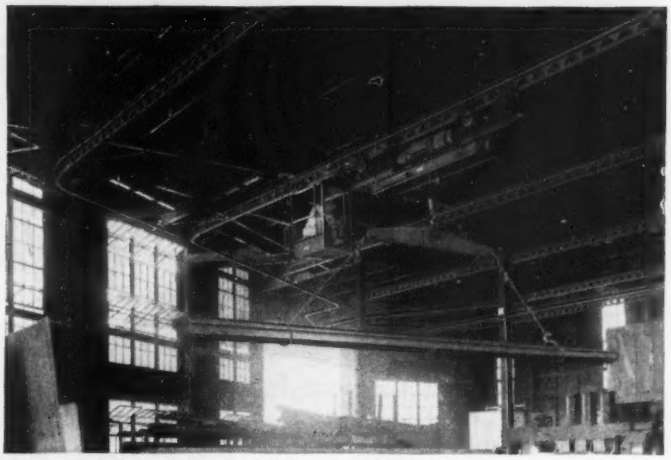


Lexington 47, Ky., include easily adjusted sliding head, leakless tubular steel cylinders, main pulling cylinder in direct line with face plate bore to assure straight pull and hardened and ground ways well above broach center line.

Motor and pump are in an easily accessible, well ventilated compartment. The hydraulic circuit is equipped with a safety relief valve

MATERIALS HANDLING FOR EVERY INDUSTRY

Plants in nearly every conceivable industry are enjoying numerous advantages possible with Cleveland Tramrail. They are speeding production and lowering costs by eliminating rehandling and providing straight line production efficiency. They are reducing floor congestion and greatly increasing warehouse storage capacity. In many instances, they are eliminating need of plant expansion by installing Cleveland Tramrail.

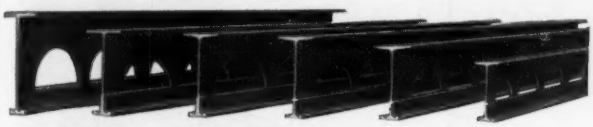


Many hours of hard labor are being saved every day by Cleveland Tramrail Systems like this. The cab-controlled motor-driven carrier handles speedily long unwieldy bar steel and pipe from cars to stock, and from stock to points of work.

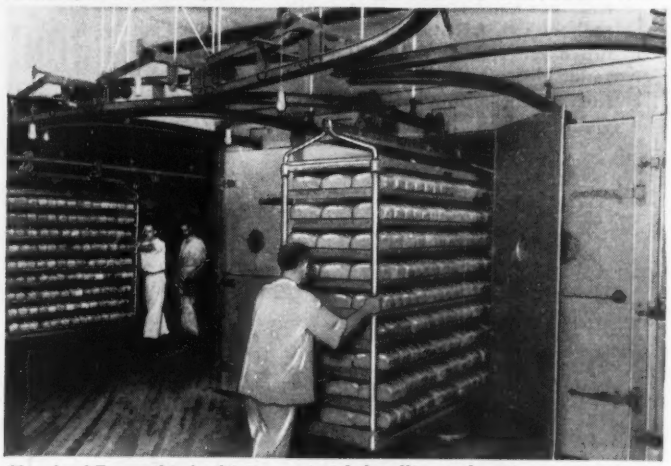
STANDARD ITEMS EASILY COMBINED TO HANDLE MATERIALS OF ANY KIND

Cleveland Tramrail raised-tread long-wear rail.

Cleveland Tramrail consists of standard items such as rail, switches, carriers, cranes, hoists, grabs, etc., which can be combined in a thousand-fold ways to serve nearly every materials handling requirement.

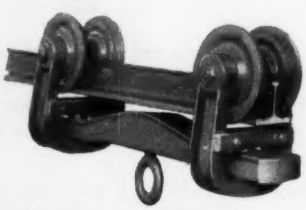


Cleveland Tramrail Archbeam in seven sizes for various loads and conditions.



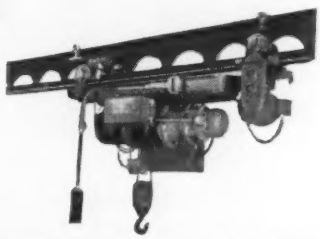
Cleveland Tramrail is facilitating materials handling and cutting costs in many bakeries. Large rack loads of bread are easily handled through oven, cooling box, etc. An overhead Tramrail system with proper switches eliminates need of usual floor equipment.

30,000 INSTALLATIONS



Hand propelled carrier built for long life and easy operation. Wheels have hardened tread and flange; bearings are double race type.

Backed by experience with 30,000 installations in industries of all types, Cleveland Tramrail representatives are in exceptionally good position to serve you. They will gladly advise, survey your plant, make layout or prepare quotation without obligation.



Motor-driven carrier with electric hoist. One of many types built by Cleveland Tramrail.

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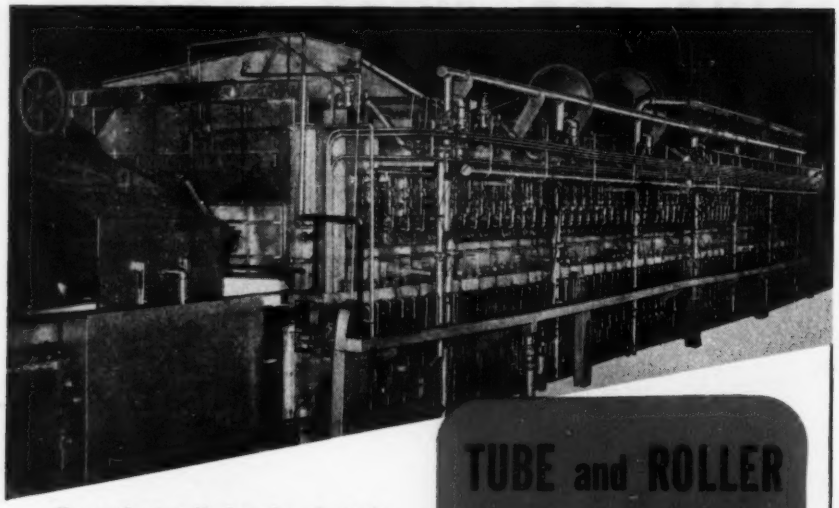
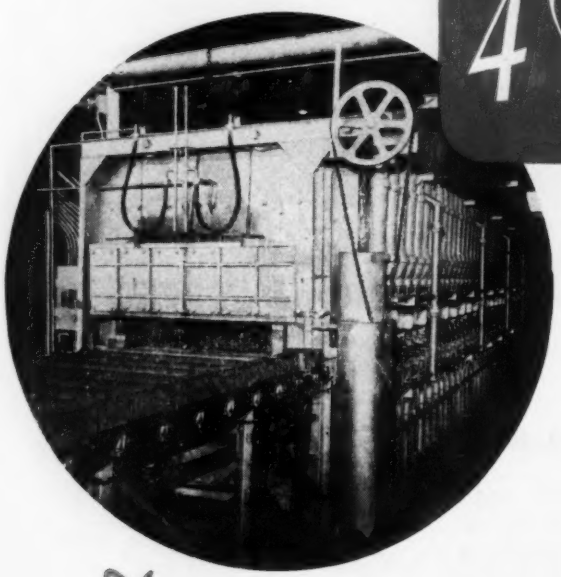
CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT



Recently installed in the plant of a large steel producer, this 5'6"x70' annealing furnace is used to anneal stainless steel sheets. It is equipped with *CARBOFRAX radiant tubes and rollers. (*CARBOFRAX is a registered trade-mark indicating manufacture by the Carborundum Company.)

TUBE and ROLLER HEARTH FURNACE UPS PRODUCTION 4 Ways



The improved design of this new GASMACO furnace has resulted in these production economies to the user: (1) manpower requirements reduced by 60% (2) stainless steel sheets are uniformly annealed within 2 points of hardness—surface finish is free of defects (3) pickeling time reduced to 20% (4) polishing time reduced 50%.

These production economies reflect GASMACO's 45 years' experience in industrial furnace engineering and manufacture—experience available to you on your next heat-treating job.

THE GAS MACHINERY COMPANY

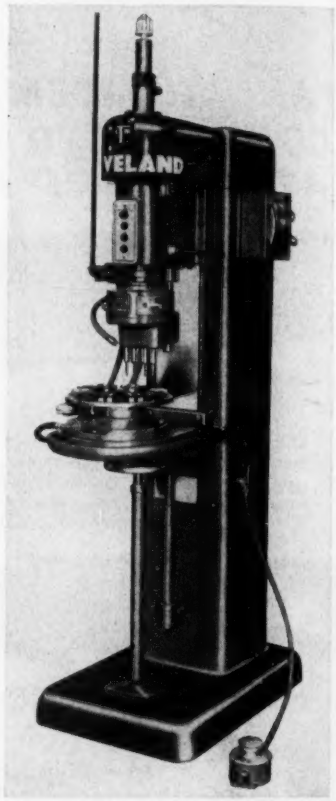
16116 WATERLOO ROAD
CLEVELAND 10, OHIO

Designers • Fabricators • Erectors
Gas Plant Equipment and Industrial Furnaces

and the machine has a built-in speed control valve for adjustment of cutting speed. A high speed individual return cylinder is included.

15. Tapping Machine

Either manual or automatic tapping operation is possible with model EO lead screw tapping machine made by Cleveland Tapping Machine Co., Hartville, O. Powered by a ¾-horsepower, 1200 revolutions per minute high reversal motor, it will tap single holes



up to ½-inch national coarse thread in mild steel, or using multiple heads, as many as eight No. 6-32 or four ¼-inch holes. Reversal capacity is 1650 strokes per hour.

Hardened tool steel lead screw is precision ground to 0.0002-inch and has 1¾-inches of full diameter thread contact with wear compensating split bronze lead screw nut. Wick oiler provides positive lubrication to lead screw and nut. Tapping depth is easily and positively controlled to within 0.005-inch making blind hole tapping safe.

16. Measuring Tool

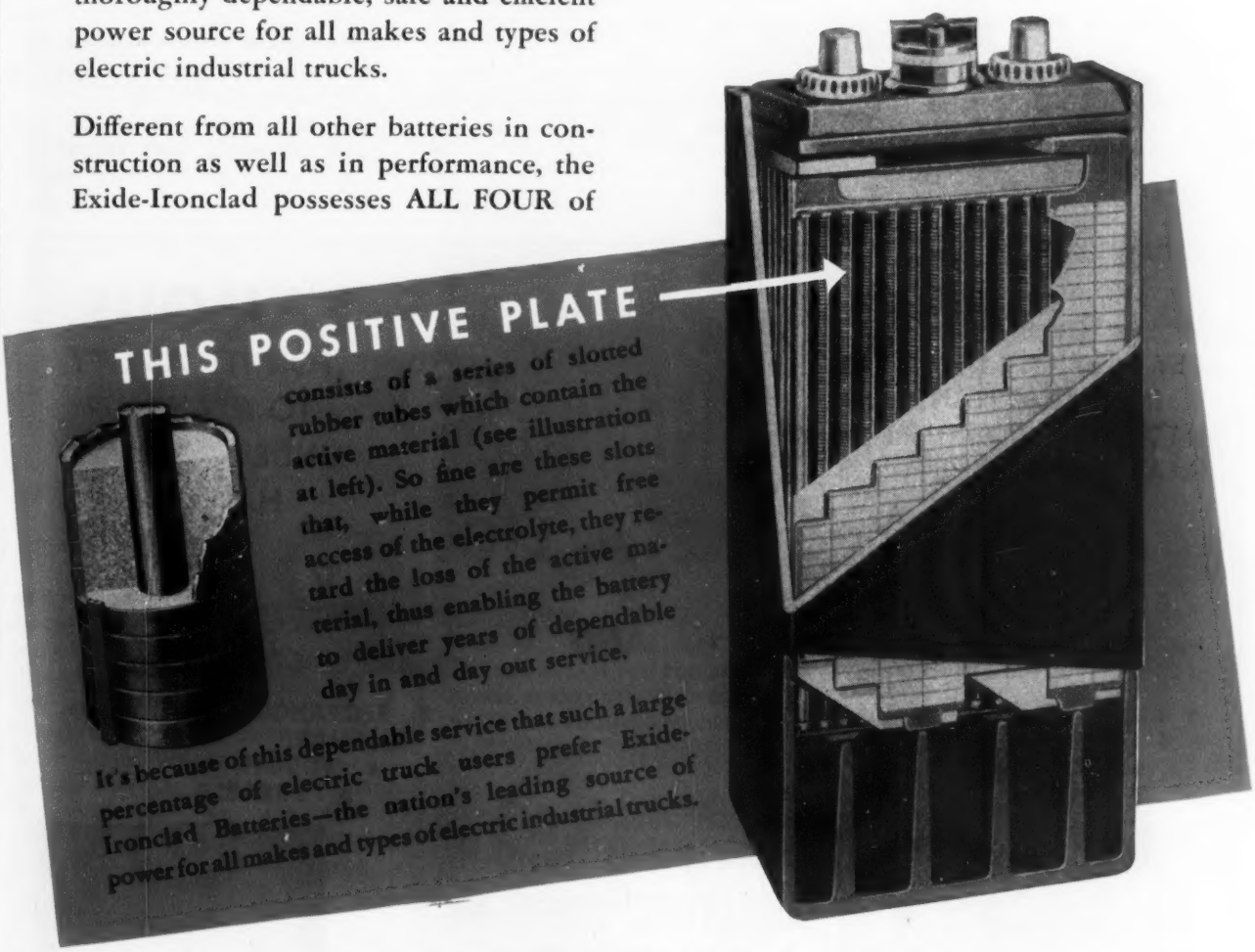
Usable as a planer, height or depth gage, as gage blocks, screw jack, carriage stop, etc., are the Micro screw jack and height gage, developed by Engineer's Forging Co., 308 Boulevard Bldg., Detroit 2, Mich. Versatile heavy duty tools are of

USERS EXPRESS PREFERENCE FOR Exide IRONCLAD BATTERIES

IN a recent national survey made by a leading industrial publication, 81.1% of electric industrial truck users expressed a preference for Exide-Ironclad Batteries.

Such overwhelming preference for the Exide-Ironclad Battery is based upon user experience. This unique battery has, during the past 35 years, proved itself to be a thoroughly dependable, safe and efficient power source for all makes and types of electric industrial trucks.

Different from all other batteries in construction as well as in performance, the Exide-Ironclad possesses ALL FOUR of the essential characteristics demanded of a battery for electric industrial truck service—(1) high power ability, (2) high efficiency, (3) great ruggedness, and (4) long life. These characteristics are due to the special construction of the Exide-Ironclad Battery, especially its rugged, tubular positive plate.


THIS POSITIVE PLATE
consists of a series of slotted rubber tubes which contain the active material (see illustration at left). So fine are these slots that, while they permit free access of the electrolyte, they retard the loss of the active material, thus enabling the battery to deliver years of dependable day in and day out service.
It's because of this dependable service that such a large percentage of electric truck users prefer Exide-Ironclad Batteries—the nation's leading source of power for all makes and types of electric industrial trucks.

Write for further particulars and FREE copy of Exide-Ironclad Topics, which covers latest developments in material handling and shows actual case histories.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

the same construction, the only difference being in tolerance. Micro screw tolerance is plus or minus 0.001-inch, vertical only. The Micro height gage tolerance is plus or minus 0.0005-inch, vertical and horizontal.

Base diameter of tools is 1½-inches and gaging range is 1½ to 2⅜-inch, plus extensions and attachments for height, depth and inside diameter.

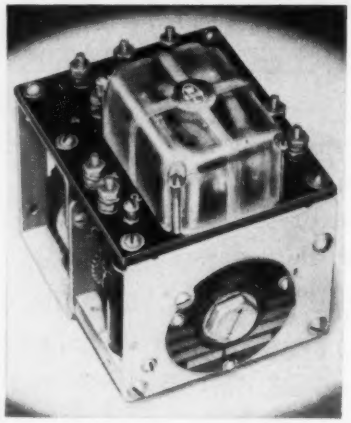
17. Pipe and Tube Cutter

Compact and portable, the E-Z Cut pipe and tube cutter, manufactured by Quijada Tool Co. Inc., 5474 Alhambra Ave., Los Angeles 32, Calif., features power driven rollers, automatic stop-start action and ball bearing operation. It will handle these operations in pipe diameters ranging from ⅜ to 4 inches.

A ½-horsepower, 110-volt, alternating current motor, integrally mounted, furnishes direct gear drive to rollers. Gears are self-lubricating. An automatic trip switch starts operation when cutter wheel contacts the pipe and automatically stops when cut is finished. Adjustable roller yokes provide necessary support for the pipe that is to be cut.

18. Time Delay Relay

Designed for use in processing, machine tool, signal, sound and other control equipment or systems where an adjustable time delay, after closing the pilot circuit, is required for proper operation is the Bulletin 362 motor-driven time delay relay with composite connections, built by Ward Leonard Electric Co., Mount Vernon, N. Y. By properly connecting external connection jumpers to the relay terminal board, delayed make with a maintained pilot circuit and instantaneous make and delayed break with a momentary contact pilot circuit timing sequences can be obtained.



Relay consists of a small synchronous motor, differential gear system, built-in break assembly, trip switch assembly, terminal board and auxiliary relay. A safety locking device prevents unintentional time setting changes.

19. Motor Starters

High voltage motor circuits may be protected against damage from short circuits by the Valimitor motor starters, announced by Electric Controller & Mfg. Co., 2700 East 79th St., Cleveland 4, O., for use with 2300 to 4600 volt motors. They may be used at any point on any power system regardless of the available kilovolt-amperes. Starters limit the maximum fault current that can be obtained on any system to approximately 25,000 kilovolt-amperes, which is easily interrupted by the type ZHS magnetic contactor.

As the starter limits the maximum obtainable fault current to a

(For more information, use the card following page 142.)

ACCEPTED
BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

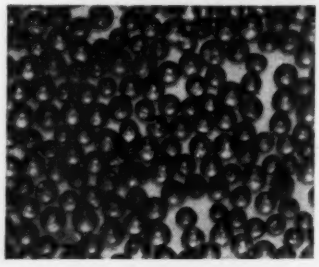
HI-GRADE METALLIC

FAMOUS
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

SHOT AND GRIT

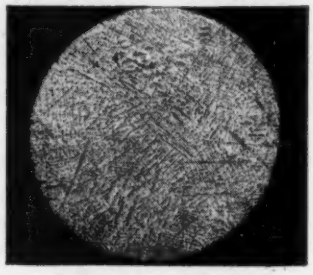
- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

- RECTANGULAR
- SHARP
- TOUGH
- DURABLE



UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY
3896 LONYO ROAD
DETROIT 10, MICHIGAN
CEdar 7200



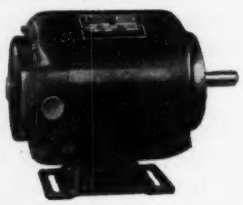
MICROSCOPIC STRUCTURE OF METAL

value independent of the kilovolt-ampere of the power system, the installation remains permanent. Each

is a self contained unit and is built to provide across-the-line starting, also in the reduced voltage starting style.

20. Capacitor Start Motor

Improvements in capacitor start, induction run type motor now being produced by Brown-Brockmeyer Co., Dayton 1, O., include an inbuilt fan cooled condenser and an enclosed switch actuator that has no tension springs to break or pins to get displaced. Motor is available in ¼ through 1½-horsepower, 115/230

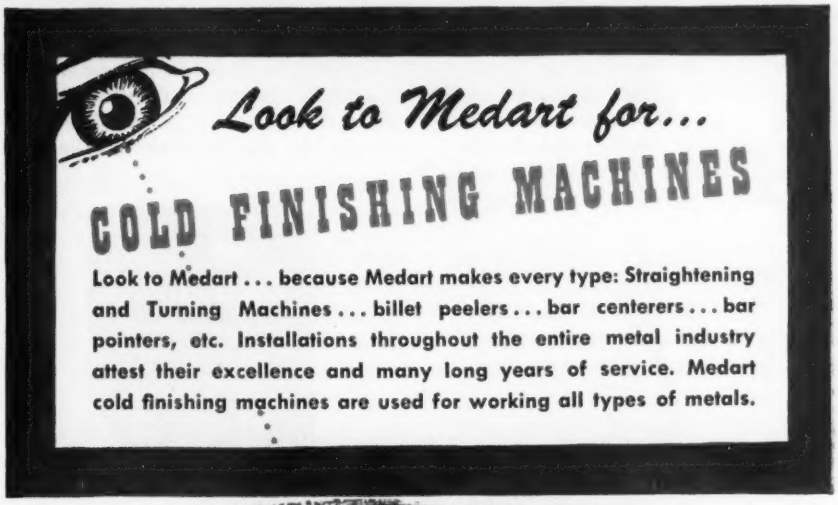


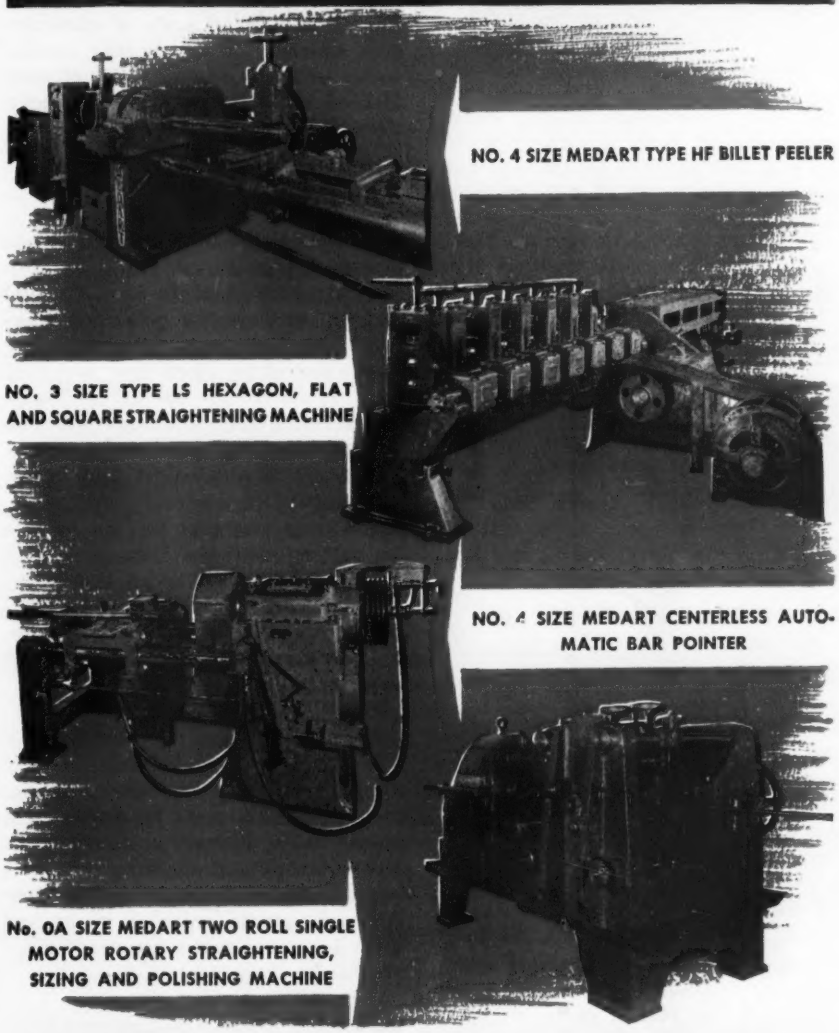
double voltage, 60 cycle, single phase and 1750 revolutions per minute with a minimum of 350 per cent starting torque.

It is equipped with pre-lubricated Life-Seal ball bearings and is suitable for either vertical or horizontal operation. Rugged steel housing and slotted, welded steel base give rigidity for true alignment. Cord, plug and switch are furnished if desired.

21. Drum Tongs

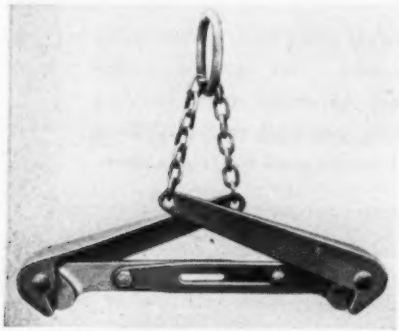
Lightweight drum tongs for moving, loading and stacking drums are now being manufactured by Downs Crane & Hoist Co., 540 West Vernon Ave., Los Angeles 37, Calif. Made for heavy duty service, tongs can handle all drums with or without


Look to Medart for...
COLD FINISHING MACHINES
Look to Medart . . . because Medart makes every type: Straightening and Turning Machines . . . billet peelers . . . bar centerers . . . bar pointers, etc. Installations throughout the entire metal industry attest their excellence and many long years of service. Medart cold finishing machines are used for working all types of metals.


NO. 4 SIZE MEDART TYPE HF BILLET PEELER
NO. 3 SIZE TYPE LS HEXAGON, FLAT AND SQUARE STRAIGHTENING MACHINE
NO. 4 SIZE MEDART CENTERLESS AUTOMATIC BAR POINTER
No. 0A SIZE MEDART TWO ROLL SINGLE MOTOR ROTARY STRAIGHTENING, SIZING AND POLISHING MACHINE

heads from 18 to 24 inches in diameter. Lifting arms are self-equalizing and both jaws have same positive grip. Holding power is not affected by oily or greasy surfaces and jaws will not kink or damage the drum.

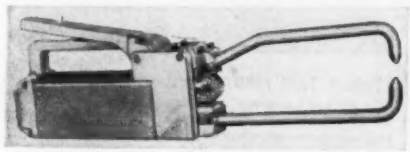
Drums may be moved into and out of storage in an upright position and



stacked in tiers to any height. Open drums can be handled without spilling contents and trucks loading and unloading can be speeded by the use of tongs.

22. Spot Welder

Completely portable and self operating, a new lightweight spotwelder, built by Greyhound A. C. Arc Welder Corp., 604 Johnson Ave., Brooklyn 6, N. Y., weighs only 23 pounds. It will weld up to ⅛-inch combined thickness of metal. Unit



is enclosed in a compact noncorrosive cast aluminum casing with integral handle for carrying.

Protruding copper arms are available in lengths of 6, 12 and 18 inches. Durable replaceable alloy tips are available in an assortment of shapes for specific needs. Each unit has a silicon steel and copper transformer wound with spun glass insulated magnet wire. Welders are available in either 220 or 110-volt units.

23. Galvanometers

Moving system, magnet, lamp, scale and lamp transformer of the new type E galvanometer, manufactured by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa., are enclosed in a single compact case. Instrument is simply placed on bench or table, plugged into a 115 volt, 50 or 60 cycle outlet and it is ready to use. Available sensitivities are 0.5-microvolt, 0.005 and 0.0005-microampere per millimeter. Period is only about 3 seconds.

Instrument also has low sensitivity which is of value in initial stages of measurement. If a deflection shoots the galvanometer's indicating

limit light-spot off scale, a secondary spot appears. Scale has fifty 1 millimeter divisions on either side of zero. Deflection is linear with 1 per cent. Zero is adjusted by a knob.

24. Direct Current Motor

A light, compact constant speed direct current motor, made by Amglo Corp., 4234 Lincoln Ave., Chicago 18, Ill., utilizes the polarized magnetic drive principle of a vibrating reed, providing clock-like accuracy and synchronous operation. Basic motor frame and aluminum reduction gearing occupies an area 2 1/2 x 3 1/2 x 1 5/8-inches. Weight is approximately 10 ounces.

Motor is available for use on line or battery voltages from 3 to 110, with a rotor shaft speed of 900 revolutions per minute. Built-in reduction gears, special cams and switching arrangements, are furnished to meet user needs.

DEVELOPED BY . . .

25. Norton Co., Worcester, Mass., ceramic surface plate for use in toolrooms and inspection departments where setups and checking measurements require great accuracy. Plate will not corrode, warp or sweat and after long use shows no wear on instruments or on itself.

26. Sheffer Collet Co., Traverse City, Mich., a master collet in which pads may be changed without removing collet from spindle. Style SM collet has pads held in place by standard socket set screw which locks in T-slot in collet face.

27. Center Scope Products, Glendale 4, Calif., series M center scope for precision locating needs on lathes, drill presses, jig borers and vertical boring mills. Overall body length is 2¾-inches and shank diameter is ⅜ x 1 inch long.

28. Federal Products Corp., Providence 1, R. I., model 500 automatic dimensional recording gage which measures workpiece and records resulting dimension on a continuous tape graduated in thousandths and half thousandths of an inch. Normal range is 0 to 1 inch. It will check to within plus or minus 0.003-inch.

29. Link-Belt Co., Chicago 1, Ill., stock silent chain that will operate on sprockets cut to new industrial-standard tooth form and stock silent chain sprockets to fit new industrial-standard silent chain. Chain is offered in middle guide type in ½ and ¾-inch pitch sizes and in various widths.

30. Richardson - Allen Corp., New York, N. Y., line of small, light, portable battery chargers featuring a meter which can be read while battery is being charged. Models are available rated from 6 to 80 amperes for average to fast charging.

31. Clipper Diamond Tool Co. Inc., New York 19, N. Y., cluster type diamond dressing tool in two styles with 20 small diamonds symmetrically inserted in a matrix. Diamonds, even if worn, will not broaden and develop large flats.

32. General Electric Co., Schenectady 5, N. Y., a thin-probe gauss meter and a triple kit combining three gauss meters of different ratings in one case. New model, with probe of 0.052-inch diameter, permits measurement of flux in small-gap measurements.

33. Palmer-Shile Co., Detroit 27, Mich., lightweight keg truck weighing but 22 pounds with metal or 15 pounds with rubber wheels. Sliding safety catch holds lip or open end of keg.

34. Thomas Laughlin Co., Portland 6, Me., clevis grab hook which can be quickly attached and detached from chain by a clevis pin and cotter. All parts are drop forged and heat treated. Sizes offered are from ¼ to ⅝-inch.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL PRICES— Strong tone prevails in the steel markets but talk of a likely general advance in prices soon has been stilled, for the present at least, by last week's announcement of U. S. Steel Corp. that it had denied the substantial wage increase demands of the Steelworkers' union and that, effective May 1, it was reducing prices on a wide variety of steel products, including certain flat-rolled items.

The price reductions, which vary in amount for the different products are estimated to total $25 million yearly based on 1947 shipments. The overall cut is more than twice as large in amount as the total increases last February in the corporation's prices for semifinished steel.

TRADE SURPRISED— Reaction of other producers to the Steel corporation's move was not immediately clear, the announcement seemingly taking the entire industry by surprise. Whether other major steelmakers would adopt a similar policy, both with respect to wages and prices, remains to be seen. Meanwhile, speculation over the future trend of the market continues, and isolated product price changes are anticipated from time to time, such as the increase of $7 per ton on plates effected last week by an eastern producer and an increase on stainless sheets by another interest.

AVERAGES— STEEL's arithmetical price composite on steelmaking scrap rose fractionally last week to $40.50 from $40.42 for the previous week and compared with $31.33 for the like 1947 week. Composites held unchanged last week and compared with those for the like 1947 week at $81.14 and $69.82 on finished steel, $68.72 and $52.10 on semifinished steel, $39.18 and $32.49 on steelmaking pig iron.

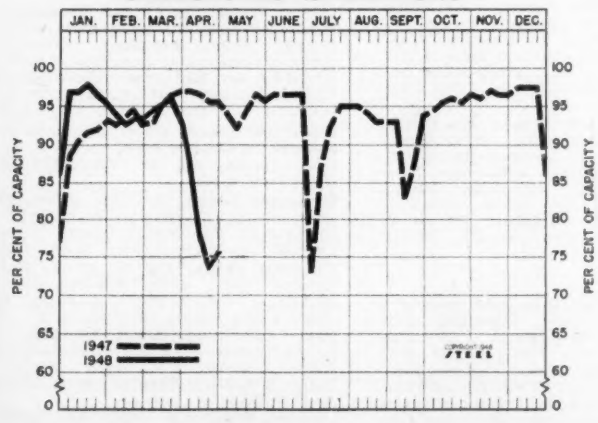
PRODUCTION RECOVERING— Steel operations are expected to return to normal within two weeks or so, providing the back-to-work movement in the coal mines continues. Assuming no further interruptions, some steelmakers think a new peacetime production record, on a weekly basis, may be attained before end of the current quarter. This view is based on improvement in flow of scrap and passing of the gas and fuel oil shortages. Once coal inventories are restored, ingot production should jump sharply, though possible mine labor trouble at the end of June may cause steel producers to move cautiously to conserve fuel stocks.

INGOT OPERATIONS— Gradual return of the miners to the pits permitted the steel producers to step up operations last week. The estimated national rate rose 2½ points to 75.5 per cent of capacity. Operations were at 96 per cent prior to the start of the strike in March.

STEEL SUPPLY— In excess of 1,330,000 tons of steel production were lost up to the end of last week due to the coal strike, and several hundred thousand tons more will be lost before pre-strike operating levels are regained. As a result supply shortages will be intensified. Operations have been curtailed in some metalworking plants and output of thousands of automobiles, freight cars and other needed equipment is being lost.

SUPPLY-DEMAND BALANCE— Earlier this year it had been hoped to attain supply-demand balance in some major steel products. However, the loss of production due to the coal strike, coupled with the increased requirements for foreign aid, military preparedness and favored domestic programs, have dissipated hopes for early balance. Supply shortages are certain to affect all industry since consumers, large and small, have no reservoir from which to draw. Some producers expect to block out allotments for one month in order to get on as current a basis as possible. They estimate deliveries will be set back at least that much. It is certain steel supplies will be as tight as at anytime since the end of the war, infusing new vigor into the gray and ingot conversion markets.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Apr. 24	Change	Same Week 1947	Same Week 1945
Pittsburgh	82.5	+ 9	101	59
Chicago	85	— 1.5	96	71
Eastern Pa.	68	+ 7	90.5	79
Youngstown	51	+ 1	86	60
Wheeling	72	—10	93.5	86
Cleveland	95.5	— 0.5	93	95
Buffalo	64	None	88.5	88.5
Birmingham	72	+31	99	64
New England	80	None	95	88
Cincinnati	52	—33	85	79
St. Louis	85	— 4.5	92	54
Detroit	101	None	92	90
Estimated national rate	75.5	+ 2.5	95.5	70

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

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COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Apr. 24	Apr. 17	Month Ago Mar. 1948	Year Ago Apr. 1947	5 Years Ago Apr. 1943
Finished Steel	$81.14	$81.14	$81.14	$69.82	$56.73
Semifinished Steel	68.72	68.72	68.72	52.10	36.00
Steelmaking Pig Iron	39.18	39.18	39.34	32.49	23.00
Steelmaking Scrap	40.50	40.42	40.21	33.94	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Mar. 1948	3.57435c
Feb. 1948	3.54374c
Mar. 1947	3.10998c
Mar. 1943	2.43678c

* **STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composite, dollars per net ton; pig iron and scrap, gross ton.

† **FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 82 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute; Structural shapes; plates; standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. March figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton; others dollars per gross ton.

Finished Materials

	April 24, 1948	Mar., 1948	Jan., 1948	Apr., 1947
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.60c
Steel bars, del. Philadelphia	3.356	3.356	3.348	2.98
Steel bars, Chicago	2.90	2.90	2.90	2.60
Shapes, Pittsburgh	2.80	2.80	2.80	2.50
Shapes, del. Philadelphia	2.968	2.968	2.966	2.64
Shapes, Chicago	2.80	2.80	2.80	2.50
Plates, Pittsburgh	2.95	2.95	2.95	2.65
Plates, del. Philadelphia	3.19	3.19	3.186	2.85
Plates, Chicago	2.95	2.95	2.95	2.65
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.95	3.95	3.93	3.55
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Gary	3.95	3.95	3.93	3.55
Strip, hot-rolled, Pittsburgh	3.05	3.05	2.80	2.50
Strip, cold-rolled, Pittsburgh	3.80	3.80	3.55	3.20
Bright basic, bess. wire, Pittsburgh	3.775	3.775	3.695	3.425
Wire nails, Pittsburgh	5.20	5.20	4.67	4.125
Tin plate, per base box, Pittsburgh	$6.70	$6.70	$6.70	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$53.57	$44.64
Slabs, Pittsburgh, Chicago	45.00	45.00	40.18	37.506
Rerolling billets, Pittsburgh	45.00	45.00	40.18	37.506
Wire rod ⅜ to ¼-inch, Pitts.	3.175c	3.175c	3.10c	2.55c

Pig Iron

	April 24, 1948	Mar., 1948	Jan., 1948	Apr., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$40.996	$40.996	$40.379	$34.83
Basic, Valley	39.00	39.00	38.40	33.00
Basic, eastern del. Philadelphia	42.004	42.004	41.372	35.52
No. 2 fdry., del. Pgh. (N.&S. sides)	40.496	40.496	39.879	34.33
No. 2 fdry., del. Philadelphia	42.504	42.504	41.871	36.02
No. 2 foundry, Chicago	39.00	39.00	38.60	33.00
No. 2 foundry, Valley	39.50	39.50	36.50	33.50
Southern No. 2, Birmingham	37.88	37.88	34.88	29.28
Southern, No. 2, del. Cincinnati	42.23	41.857	37.74	34.15
Malleable, Valley	39.50	39.50	38.90	33.50
Malleable, Chicago	39.50	39.50	39.10	33.50
Charcoal, low phos., fob Lyles, Tenn.	55.00	55.00	50.00	40.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.25

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.25	$40.25	$40.30	$35.81
Heavy melt. steel, No. 2, E. Pa.	39.00	39.00	41.30	33.25
Heavy melt. steel, No. 1, Chicago	39.25	38.875	39.05	32.75
Heavy melt. steel, No. 1, Valley	40.25	40.25	40.04	34.56
Heavy melt. steel, No. 1, Cleveland	39.75	39.75	39.75	34.06
Heavy melt. steel, No. 1, Buffalo	43.00	44.00	43.30	34.25
Rails for rerolling, Chicago	49.50	49.625	60.00	38.25
No. 1 cast, Chicago	69.00	66.00	63.50	42.50

Coke

Connellsville, beehive furnace	$12.50	$12.50	$12.50	$9.06
Connellsville, beehive foundry	14.875	14.875	14.60	10.375
Chicago, oven foundry, del.	19.25	19.25	19.19	16.10

FINISHED AND SEMIFINISHED IRON STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95 per gross ton. Forging quality $46 per net ton, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56 per gross ton.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Buffalo, Birmingham, $45 per net ton; Cleveland, $47 per net ton; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $54 per net ton.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66 per gross ton.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60 nom., per net ton; sales in open market $95-105 per gross ton.

Skelp: Pittsburgh, Youngstown, 2.90c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70 per net ton; some sellers quoting up to $120 per gross ton.

Wire Rods: Pittsburgh, Chicago, Birmingham, ⅜ to ¼-inch, inclusive, $2.80-3.55 per 100 lb. ⅜ to 11/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.5245.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.06c; eastern Mich., 3.13c; New York, del., 3.392c; Phila., del., 3.356c; San Francisco (base, del.), 3.6345-3.95c; Los Angeles (base, del.), 3.629-3.86c; Seattle, 3.8375-3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.71c; Toledo, 3.78c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base 4.10c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.3345c; Los Angeles (base, del.), 3.329c; Seattle, 3.88c-4.18c base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined: Pittsburgh 7.70c (hand puddled), Economy, Pa., 8.65c. Double refined: Pittsburgh 9.75c (hand puddled), Economy, Pa., 10.00c. Staybolt: Pittsburgh 11.25c (hand puddled), Economy, Pa., 10.20c.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Detroit, del., 2.96-3.01c; eastern Mich., del., 3.03-3.08c; Philadelphia, del., 3.04c; New York, del., 3.172c; Los Angeles (base, del.), 3.544c; San Francisco, (base, del.), 3.5495c, (Alan Wood Steel Co., Conshohocken, Pa., quotes 4.20c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.71-3.76c; Eastern Mich., del., 3.78c-3.83c; New York, del., 4.042c; Philadelphia, del., 4.006c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Canton, Middletown, 3.95c; Kokomo, 4.55c; Youngstown, 3.95-4.45c; Granite City, 4.35c; New York, del., 4.322c; Philadelphia, del., 4.19c; Los Angeles (base, del.), 4.724c; San Francisco (base, del.), 4.7295c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c; Granite City 5.00c and 5.35c, respectively; copper alloy, 4.90c, Kokomo. Los Angeles (base, del.), 5.344c; San Francisco (base, del.), 5.3495c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Middletown, 3.95c; Youngstown 3.95c-4.45c; Granite City, 4.05c; Detroit, del., 4.11c; eastern Mich., 4.18c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. **Armature:** Pittsburgh, 4.80c-5.30c; Chicago, Gary, 4.80c; Granite City, Ill., 5.25c; Kokomo, Ind., 4.90c. **Electrical:** Pittsburgh, 5.30c-5.80c; Chicago, Gary, 5.30c; Granite City, Ill., 5.75c; Kokomo, Ind., 5.40c. **Motor:** Pittsburgh, 6.05-6.80c; Chicago, Gary, 6.05c; Granite City, 6.50c.

Dynamo: Pittsburgh, 6.75c-7.00c; Granite City, 7.20c. **Transformer 72,** 7.25-8.25c; **65,** 7.95-9.20c; **58,** 8.65-9.90c; **52,** 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, 2.80c-3.30c; Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.96-3.01c; eastern Mich., del., 3.03-3.08c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, 3.55c-4.05c; Cleveland, Youngstown, 3.55c-3.85c; Chicago base, 3.65c; Detroit, del. 3.71-3.76c; eastern Mich., 3.78-3.83c; Worcester, base, 3.75c-4.45c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., per base box of 100 lb, 1.25 lb coating $6.60, 1.50 lb coating $6.80; Granite City, Birmingham, Sparrows Point, 1.25 lb coating $6.70, 1.50 lb coating $6.90.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.25 lb tin, $5.80; 0.50 lb tin, $6.00; 0.75 lb tin $6.20; Granite City, Birmingham, Sparrows Point, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 55 to 70 lb basis weight, $5.20; 75 to 95 lb basis weight, $5.10; 100 to 128 lb basis weight, $5.20.

Hollowware Enameling Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage, 4.75c per lb; Granite City, Birmingham, Sparrows Point, 4.85c per lb.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.90; Granite City, Birmingham, Sparrows Point, $6.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, 3.45c; Claymont, 3.65c; Geneva, Utah, (base, del.), 3.125c; Det., del., 3.21c; New York, del., 3.322c; Phila., del., 3.19c; Boston, del., 3.423c; St. Louis, del., 3.269c; San Francisco and Los Angeles, del., 3.693c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa., 5.10c, basing points.)

Floor Plates: Pittsburgh, Chicago, Cleveland, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.80c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 24.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.088c; Phila., del., 2.968c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41-3.474c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.543c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds.)

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.55-4.00
Basic MB Spring (except Birm.)	**$4.95
Upholstery Spring (except Birm.)	†$4.60

Wire Products to Trade in carloads

Wire, Merchant Quality	
Annealed (6 to 8 base)	††$4.20
Galvanized (6 to 8 base)	††$4.65

(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).

Nails	
Standard, cement-coated, galvanized	‡94
Staples, polished and galvanized	‡‡94
Woven fence, 15½ gage and heavier	§100
Barbed wire, 80-rod spool	§§113
Fence Posts (with clamps)	107
Bale ties, single loop	§99

* Worcester, $3.65; Duluth, $3.60, base; San Francisco (base, del.), $4.56, bright basic only.
** Worcester, $5.05; Duluth & Trenton, N.J., $5.20 (bright only); San Francisco (base del.) $5.9845.
† Worcester $4.70; Duluth and Trenton, N. J., $4.85, base. San Francisco (base, del.) $5.6345 black upholstery.
†† One producer quotes 25 cents higher at Birmingham and Chicago; Worcester $4.30, annealed, $4.75, galvanized; Duluth $4.20, annealed, $4.65, galvanized; Kokomo, Ind., $4.80 annealed, $5.25 galvanized; San Francisco (base, del.) $5.21, annealed, $5.66 galvanized.
‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 100; Cleveland 97; San Francisco (base, del.) 115.
‡‡ Cols. 108 and 114 also quoted Pittsburgh; Worcester 100, San Francisco (base del.) 115.
§ San Francisco (base del.) 123.
§§ San Francisco (base del.) 133.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.
Relaying, 60 lb and over fob warehouse $60-$65 per net ton.
Supplies: Track bolts, 7.06c; heat treated, 7.25c. Tie plates, $3.65 per 100 lb, fob mill; $3.40 base, Seattle; $3.80 base, Pittsburg, Calif. Splice bars $3.85 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	44½	17	1	52½	36½
¼	44½	21½	1¼	53	37
⅜	41	17	1½	53½	37½
½	47	29½	2	54	38
¾	50	33½	2½ & 3	54½	38½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	44½	28	44	27½	43½	27
2½ & 3	48½	32	47	30½	46½	30
3½-6	50½	34	49	32½	48½	32

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	43½	1	51½
¼	43½	1¼	52
⅜	40	1½	52½
½	46	2	53
¾	49	2½ & 3	53½

In.	Lap Weld	Elec. Weld	Seamless
2	43½	43	42½
2½ & 3	46½	46	45½
3½-6	48½	48	47½
8	50½	50	49½
10	50	49½	49
12	49	48½	48

Standard Wrought Iron Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh.

	Butt Weld			Lap Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅜	+46½	+74½	1¼	+12	+34½
½	+11	+35	1½	+ 6	+27½
¾	+ 1½	+25	2	— 1½	+20
1 and 1¼	— 4	+16½	2½-3½	— 4	+16
1½	— 9½	+13	4	— 8	+10½
2	—10	+12½	4½-8	— 6	+12
			9-12	+ 3	+21½

Boiler Tubes: Net base prices per 100 ft. fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

O.D.		—Seamless—		—Elec. Weld—	
		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$12.46	$11.51	$11.51
1¼"	13	....	14.76	11.48	13.64
1½"	13	$14.00	16.47	12.69	15.22
1¾"	13	15.92	18.74	14.43	17.31
2"	13	17.84	20.99	16.17	19.39
2¼"	13	19.88	23.40	18.02	21.62
2¼"	12	21.90	25.77	19.86	23.80
2½"	12	23.99	28.21	21.75	26.06
2¾"	12	25.42	29.90	23.05	27.63
3"	12	26.68	31.40	24.18	29.00
3¼"	11	31.06	36.55	28.16	33.77
3½"	11	33.35	39.26	30.23	36.27
4"	10	41.40	48.70	37.53	44.99
4½"	9	54.87	64.58	....	....
5"	9	63.52	74.74	....	....
6"	7	97.51	114.73	....	....

Pipe Cast Iron: Class B, 6-in. and over $79.50 per net ton, Birmingham; $84.50, Burlington, N. J.; $91.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 19c per cwt in carlots, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step, plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ¾ x 6-in. and shorter	46 off
⅝-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	46 off	....
½-in. and smaller	....	44 off
⅝-in.-1-in.	44 off	....
⅝-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	.....5.65c plus 19c per cwt in cl., 26c lcl.
⅞-in. and under	55 off
Lebanon, Pa.	.....55 off plus 19c per cwt in cl., 26c lcl.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1-$2 off

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, cents per lb, Pittsburgh and Washington, Pa.

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442, 443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
†501	9.00	13.00	17.50	13.00	18.50
†502	10.00	14.50	18.50	14.50	19.50
‡STAINLESS CLAD STEEL (20%)					
304	....	....	24.00	22.00	....	....
410	....	....	22.00	20.00	....	....
430	....	....	22.50	20.50	....	....
446	....	....	29.00	27.00	....	....

† Low chromium. ‡ Fob Pittsburgh, Washington, and Coatesville, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.208	42.708	43.208	43.708
Brooklyn, N. Y., del.	....	44.10	44.60	....
Philadelphia, del.	42.004	42.504	43.004	43.504
Birmingham, base	35.88†	36.38†	....	....
Cincinnati, del.	....	42.23	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	47.776	47.776	48.276	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.08	40.58	41.08	41.58
Muskegon, Mich., del.	....	43.60	44.10	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.50	41.00	41.50	42.00
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	39.50	40.00	40.50	....
St. Louis, del.	40.25	40.75	41.25	....
‡Neville Island, Pa., base	39.00	39.50	39.50	40.00
Pittsburgh, del., N.&S. Sides	39.996	40.496	40.496	40.996
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Los Angeles, San Francisco	46.13	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	42.70	43.20	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.57	43.07	43.07	43.57

† Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Jan. 1, 1948; Republic quotes $2.375 higher for No. 2 foundry and malleable and $1.875 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended Apr. 25.

‡ To Neville Island base add: 79.2c for McKees Rocks, Pa., $1.212 Lawrenceville, Homestead, McKeesport, Monaco; $1.788 Oakmont; $1.596 Verona; $1.788 Brackenridge; 99.6c to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$49.50
6.51-7.00..$50.75 9.01- 9.50. 57.00
7.01-7.50.. 52.00 9.51-10.00. 58.25
7.51-8.00.. 53.25 10.01-10.50. 59.50
8.01-8.50.. 54.50 10.51-11.00. 60.75
8.51-9.00.. 55.75 11.01-11.50. 62.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.05% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.....$55.00 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.592, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$13.00
Connellsville, foundry	14.00- 15.75
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$20.50
Chicago, outside del.	18.00
Chicago, del.	19.25
Terre Haute, ovens	18.50
Milwaukee, ovens	18.75
New England, del.	20.40-20.45
Birmingham, del.	15.76
Indianapolis, ovens	18.50
Cincinnati, del.	18.95
Ironton, O., ovens	16.75
Erie, Pa., del.	19.45
Painesville, O., ovens	18.10
Cleveland, del.	19.60
Buffalo, del.	20.15
Detroit, del.	19.00
Philadelphia, ovens	17.75
Swedeland, Pa., ovens	17.75
Portsmouth, O., ovens	17.00

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	21.00†
Toluol, two degrees	28.00
Industrial xylol	28.00
Solvent naphtha	28.00

Per pound fob works

Phenol (car lots, returnable drums)	12.50
Do., less than carlots	13.25
Do., tank cars	11.50

Eastern plants, per pound

Naphthalene flakes, balls, bbl. to jobbers, "household use"	11.00

Per ton, bulk, fob plants

Sulphate of ammonia	$40.00

† Freight allowed up to 2 cents.

Refractories

Net Prices

Per 1000, fob shipping point

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$92.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	73.00
Ala., Ga.	73.00
N. J.	78.00

Intermediate Heat Duty

Ohio	67.00
Pa., Ill., Md., Mo., Ky.	67.00
Ala., Ga.	59.00
N. J.	70.00

Low-Heat Duty

Pa., Md., Ohio	59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	50.00
Wire Cut	48.00

Malleable Bung Brick

All bases	$3.00

Silica Brick

Pennsylvania	73.00
Joliet, E. Chicago	82.00
Birmingham, Ala.	73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	64.00
Chem. bonded chrome	64.00
Magnesite brick	86.00
Chem. bonded magnesite	75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	27.00
Single bags	31.50

Dolomite

Domestic, dead-burned, bulk, net tons, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%	13.50-14.00
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines	$0.78

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheet, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	6.00	...	...	...	...	6.00	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30†	5.30†	5.30	...	...	...	...	...
Shapes, Structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

† Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½"& up	H-R Alloy (**4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
Boston (city)	5.03	6.09[4]	5.79[4]	6.23[4]	7.58[4]	5.61	6.87	5.04	5.88	7.64	4.91	5.18	6.86
New York (city)	4.96	6.16	5.86	6.16	7.51	5.59	...	5.06	5.63	7.23	4.80	5.11	6.78
New York (country)	4.81	6.01	5.71	6.01	7.36	5.44	...	4.91	...	...	4.65	4.96	6.63
Philadelphia (city)	4.70	6.32	5.92	5.90	7.25	5.32	5.72	4.87	5.75	8.77	4.57	4.85	6.47
Philadelphia (country)	4.55	6.18	5.78	5.75	7.10	5.17	5.57	4.73	...	...	4.47	4.71	6.32
Baltimore (city)	4.32†	5.95	5.65	5.72	7.07	4.80	...	4.85	5.71	...	4.71	4.77	6.30
Baltimore (country)	4.17†	5.80	5.50	5.50	6.85	4.65	...	4.70	...	...	4.56	4.62	6.15
Washington (city)	4.81	...	...	...	...	5.08	...	5.14	5.79[12]	...	4.98	5.03	6.60
Washington (country)	4.71	...	...	...	...	4.98	...	5.04	...	...	4.88	4.93	6.50
Norfolk, Va.	4.90	...	...	...	...	...	...	5.20	6.00	...	5.15	5.15	6.90
Memphis, Tenn. (city)	4.82[20]§§	5.87[20]†	...	6.37	...	5.02[20]	...	4.97[20]	5.87	...	4.97[20]	5.17[20]	6.87[20]
Memphis, Tenn. (country)	4.72[20]§§	5.77[20]†	...	6.27	...	4.92[20]	...	4.87[20]	5.77	...	4.87[20]	5.07[20]	6.77[20]
Buffalo (city)	4.45	...	5.20[5]	6.05	...	5.25	5.65	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (country)	4.30	...	5.05[5]	5.50	...	4.70	5.50	4.25	4.95	6.85	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	...	5.10[8]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10§§	...	4.95[8]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.82	7.17	4.55	5.35	4.40	5.10	7.26	4.70	4.60	6.05
Cleveland (country)	4.30	5.35[8]	5.05[8]	...	...	...	5.20	4.25	4.95	...	...	4.45	5.90
Cincinnati	4.56	...	5.22	5.77	...	4.77	...	4.78	5.63	...	4.82	4.98	6.47
Detroit	4.55	...	5.30	...	...	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	...	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.85[9]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.85[9]	4.25	4.45	5.90
Milwaukee	4.658	5.708[8]	5.408[8]	5.858	7.108	4.558	5.658	4.608	5.308	7.208[9]	4.608	4.808	6.258
St. Louis	4.78	5.83[8]	5.53[8]	6.02	7.27	4.68	5.82	4.73	5.47[12]	...	4.73	4.93	6.38
Birmingham (city)	4.45[20]§§	...	...	5.65	...	4.45[20]	...	4.40[20]	5.93[22]	...	4.40	4.65	6.86
Birmingham (country)	4.30[20]§§	...	...	5.50	...	4.30[20]	...	4.25[20]	...	...	4.25	4.50	...
New Orleans	4.98[20]**	...	6.29[18]	...	...	5.18[20]	...	5.13[20]††	6.29[11]	...	5.03[20]††	5.33[20]	7.29[20]
Omaha, Nebr.	5.462	...	...	6.712	8.012	5.362	...	5.412	6.112	7.562	5.412	5.612	7.062
Houston, Tex.	5.75	...	...	7.36	8.10	6.00	...	5.35	7.00[12]	...	5.85	5.85	6.50
Los Angeles (city)	5.75	7.75[8]	7.45[8]	7.40	8.80	6.05	8.70	5.50	7.35[22]	9.35[10]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[8]	7.30[8]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[10]	5.20	5.40	7.50
San Francisco	5.40[21]	6.65[8]	...	7.05[8]	7.95[8]	5.75[21]	8.70[18]	5.05[21]	7.00[12]	...	5.30[21]	5.50[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	...	7.10[8]‡	6.95	...	5.60[17]	...	5.45[17]	7.45[19]	8.50[12]	5.25[17]	5.55[17]	7.65[17]
Portland, Oreg.	5.30[17]§§	...	7.10[8]‡	6.70	...	5.60[17]	...	5.45[17]	7.45[19]	...	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [18]—2000 lb and over; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 1999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c per 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $52, Palmerton, Pa., $51, Pittsburgh, 16% to 19% Mn., $51 Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45; Central, add 0.25c for c.l. and 0.8c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l.,8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10% C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Mn. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si. carload packed 10.9, ton lot 12.35c, less ton 14.0; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (All 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained, Si carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max. Fe). Eastern Zone, c.l., lump, bulk, regular 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb or briquet, carload packed 13.2c ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

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Secondary Aluminum Prices Up

Some remelters advance prices ½-cent further due to keen competition for scrap material, widening spread in current quotations. Other markets are firm

NEW YORK — Upward pressure on nonferrous metal prices was still in evidence last week. Actual price advances were confined, however, to certain grades of secondary aluminum ingot and various grades of scrap, principally in the red metal and aluminum classifications.

ALUMINUM — Several refiners of secondary aluminum ingots advanced their prices 1/2-cent or more, widening the spread quoted on the various grades. The advance is attributed to the high prices that must be paid for scrap which, in turn, is attributed to active competition for the material from primary producers. The market is now quoted 18.00c to 18.50c for No. 122 type of piston alloys, 17.50c to 18.25c for No. 2 grade of No. 12 aluminum, and the following levels for steel deoxidizing grade ingots: No. 1 grade, 17.75c to 18.50c; No. 2, 17.25c to 17.75c; No. 3, 17.00c to 17.25c; and No. 4, 16.25c to 17.00c.

COPPER — About 6,700,000 tons of copper are required for the national stockpile to provide for the security of the United States, according to an estimate submitted by Representative Clair Engle of California to the House Public Lands Committee on Mines and Mining. The cost of this tonnage, at current prices, is about $200,000 in excess of the Munitions Board requirements for all minerals and metals. It was pointed out that estimates of copper required for the national stockpile, or any safe amounts, are impossible of attainment under present conditions and may well remain so for many years to come.

The report recommends: "The only safe alternative to a physical stockpile of copper and the large amounts necessary for a future emergency is an immediate all-out effort by the government and industry through various long-range incentive or contract arrangements to open large low-grade marginal deposits in the United States and the small mines and properties now idle and to recover all material now available in mine and smelter waste dumps and piles, all such copper recovered to be placed in the national stockpile. Only such unstinted measures undertaken immediately will compensate for the present inability to acquire copper for the stockpile in the face of domestic and world shortages of copper that may exist for a number of years to come."

Office of Metals Reserve held 15,829 tons of copper on Mar. 31, compared with only 8016 tons on Feb. 29. The sharp increase was attributed to acquisition of 7876 tons of copper, consisting of odds and ends, found in various Army warehouses.

Supplies in the domestic market continue extremely tight. The market appeared quiet last week, however, because all of the leading producers are sold out on May delivery copper while books for June business will not be opened until late this week or the first week in May.

BRASS PRODUCTS — American Brass Co. has reduced the work schedule of employes of its Waterbury Brass Goods Division to 32 hours a week. The decrease in hours is due to a business slowdown, especially in brass produced for the cosmetics industry. The brass goods setback has not affected casting, rolling and other heavy operations.

TIN — Ricardo Martinez Vargas, Bolivian ambassador and delegate to the second meeting of the International Tin Study Group, held last week, urges that the price of tin be set no lower than $1.07 for fine tin, or that a free market be restored. Action on this proposal, or any other matter, had not been revealed officially by late last week.

Production in Bolivia is expected to total about 38,000 metric tons this year. Shipments from that country totaled 2867 metric tons in February compared with 2507 in January.

ANTIMONY — Office of Metals Reserve held 5961 tons of antimony on Mar. 31, an increase of 209 tons compared with the Feb. 29 holdings of 5752 tons. Antimony content in ore accounted for 215 tons on Mar. 31 and 215 tons on Feb. 29.

LEAD — Consumers of Mexican lead are receiving smaller tonnages than usual due to the continued shutdown of many mines in that country. Unless the flow of imports is resumed soon, they will be forced to curtail operations since other suppliers are having difficulty in meeting their regular customers' requirements and are unable to accept business from other users. Office of Metals Reserve also is unable to offer much relief, since that agency's stocks of lead totaled only 2092 tons as of Mar. 31, unchanged from the figures reported as of Feb. 29.

The average daily rate of lead production from domestic mines rose 3 per cent in February to the highest level since May, 1945, according to the Bureau of Mines. Due to the shorter work-month, however, output totaled 32,029 tons in February compared with 33,230 tons in January.

The record 17.50-cent price for lead has begun to attract large tonnages of foreign metal to this country, especially from Australia.

ZINC — The advance in freight rates which will be put into effect early in May will have relatively little effect on the cost of shipping slab zinc from western mines and smelters to the East. The freight rate on zinc and other nonferrous ores will advance 10 cents a net ton, while on slab zinc the increase will amount to only about 60 cents a ton. These increases probably will be absorbed by the producers. Demand for zinc from domestic consumers continued active last week with sales limited by the amount of metal available.

Office of Metals Reserve held 84,646 tons of zinc in all forms on Mar. 31 compared with 88,774 tons on Feb. 29. On Mar. 31 and Feb. 29, respectively, the agency held 36,506 tons and 33,964 tons of slab zinc, and 48,140 tons and 54,810 tons of zinc in ores and concentrates.

Prime western held unchanged last week on the basis of 12.00c, East St. Louis.

London Metal Exchange May Reopen July 1

CONSIDERABLE interest has been aroused in London by the proposal of metal dealers to reopen the London Metal Exchange July 1 for futures dealing in copper, lead, zinc and tin. A committee representing the Metal Exchange recently submitted concrete proposals to the government for reopening the exchange.

Details of the program have not been revealed but it is understood they provide a workable basis for resumption of future contract dealings in all four metals, despite continued shortages of tin and lead and the fact that tin still is subject to international allocation. Because they believe the proposals to be complete, the committee has expressed a readiness to start trading by July 1.

Officials of the British Ministry of Supply have not issued any comment on the proposals and have not given any indication as to the official attitude towards the plan. On previous attempts to resume metal futures trading, the government's attitude has been that the matter "is under active consideration." The unwillingness to reopen the market in the past has been due to prevailing metal shortages rather than to political objections.

Future dealings have been closed since the start of World War II, at which time the British Ministry of Supply became the sole purchaser and distributor of metals. Some metal trade authorities in London express skepticism over the prospect of an early decision by the government. Others feel that foreign exchange and political considerations will militate against a reopening for some time ahead.

Moderate optimism exists in London metal market circles, however, where it is pointed out that the proposals are considered sufficiently practical to permit trading even in those metals now relatively short. It was added that for some time the metal industry in London has been strongly critical and growing increasingly apprehensive concerning the government's bulk buying policy, especially in view of present high metal prices.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted.)

Copper: Electrolytic, 21.50c, Conn.; Lake, 21.62½c, Conn.

Brass Ingot: 85-5-5-5 (No 115) 19.25-19.50c; 88-10-2 (No. 215) 28.00c; 80-10-10 (No. 305) 24.25c; No. 1 yellow (No. 405) 15.25-16.00c. Prices include 25 cents per 100 lb freight allowance.

Zinc: Prime western 12.00c, brass special 12.25c, intermediate 12.50c, East St. Louis; high grade 13.00c, delivered.

Lead: Common 17.30-17.35c; chemical and corroding 17.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 15.00c, pigs 14.00c; metallurgical 94% min. 13.50c. Base prices for 10,000 lb and over, delivered.

Secondary Aluminum: Piston alloy (No. 122 type) 18.00-18.50c; No. 12 foundry alloy (No. 2 grade) 17.50-18.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.75-18.50c; grade 2, 17.25-17.75c; grade 3, 17.00-17.25c; grade 4, 16.25-17.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) 94.00c; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, 93.85c; grade C, 99.65-99.79%, incl., 93.50c; 99.5-99.64% 93.50c; grade F, 98-98.99% 92.60c for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American, 99-99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 33.50c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 33.75c; 25-lb pigs, 35.25c; shot, 36.25c; "F" nickel shot or ingots, for addition to cast iron, 34.25c. Prices include import duty.

Mercury: Open market, spot, New York, $75-$77 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $20.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.75, del.; special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 74.62½c per ounce.

Platinum: $98-$101 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$120 per troy ounce.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 22.00c; 5 tons and over 22.50c; 1 to 5 tons, 23.00c; less than 1 ton, 23.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 44.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 15.00c; 1000 to 19,900 lb, 14.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.00c; over 250 lb, 24.00c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c, 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 23.50c; 275-lb, or 500 bbls. 21.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 110.00c; 500 to 999 lb, 110.50c; 200 to 499 lb, 111.00c lb, 111.00c; less than 200 lb, 112.50c; ball, 1000 lb and over, 112.25c; 500 to 999 lb. 112.75c; 200 to 499 lb, 113.25c; less than 200 lb, 114.75c, fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers and resellers, 67.4c; 100 or 300 lb drums only, 100 to 500 lb, to consumers 59.2c, to resellers 54.8c; 600 to 1900 lb, to consumers 56.8c, to resellers 52.5c; 2000 to 9900 lb, to consumers 55.0c, to resellers 50.9c; 10,000 lb or more l.c.l., to consumers 53.9c, to resellers 49.9c; carloads, to consumers 52.7c, to resellers 48.7c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 37.25c, fob Cleveland; 37.00c, Detroit; 36.00c, fob Philadelphia.

Potassium Stannate: 350 to 1050 lb, 65.00c; 1400 to 2100 lb, 62.50c; 2450 lb and more, 61.50c.

Stannous Sulphate: Less than 2000 lb, 94.00c; more than 2000 lb, 93.00c.

Stannous Chloride (anhydrous): 400 lb-bbls, 89.00c; 100-lb kegs, 90.00c per lb.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, fob mill.)

Sheet: Copper 33.68c; yellow brass 30.16c; commercial bronze, 95% 33.80c, 90% 33.27c; red brass, 85% 32.23c, 80% 31.70c; best quality 31.09c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.56c; nickel silver, 18%, 42.42c; phosphor bronze, grade A, 5%, 52.70c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.69c; commercial bronze, 95% 33.49c, 90% 32.96c; red brass, 85% 31.92c, 80% 31.39c.

Seamless Tubing: Copper 33.72c; yellow brass 32.92c; commercial bronze 90% 35.68c; red brass 85% 34.89c, 80% 34.36c.

Wire: Yellow brass 30.45c; commercial bronze, 95% 34.09c, 90% 33.56c; red brass, 85% 32.52c, 80% 31.99c; best quality brass 31.38c.

Copper Wire: Bare, soft, fob eastern mills, c.l. 26.80c, l.c.l. 27.30c; weatherproof, fob eastern mills, c.l. 27.35c, l.c.l. 27.85c; magnet, delivered, c.l. 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, l.c.l. 30.50c-31.88.

ALUMINUM

(Base prices, fob shipping point)

Sheets and Circles: 2s and 3s mill finish c.l., fob shipping point.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	24.0	...	...
0.135-0.126	12-48	24.5	...	...
0.125-0.096	12-48	24.5	23.1	26.3
0.095-0.077	12-48	25.0	23.2	26.5
0.076-0.061	12-48	25.5	23.4	26.7
0.060-0.048	12-48	25.7	23.6	27.0
0.047-0.038	12-48	26.1	23.8	27.3
0.037-0.030	12-48	26.4	24.1	27.7
0.029-0.024	12-48	26.8	24.4	28.1
0.023-0.019	12-36	27.4	24.8	28.6
0.018-0.017	12-36	27.9	25.3	29.3
0.016-0.015	12-36	28.6	25.9	30.1
0.014	12-24	29.4	26.6	31.1
0.013-0.012	12-24	30.2	27.3	32.0
0.011	12-24	31.1	28.1	33.1
0.010-0.0095	12-24	32.1	29.0	34.3
0.009-0.0085	12-20	33.2	30.0	35.7
0.008-0.0075	12-20	34.4	31.1	37.1
0.007	12-18	35.7	32.3	38.8
0.006	12-18	37.0	33.5	42.6

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $20.85 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $20.10 per cwt; cut coils, $20.35. Traps and Bends: List price plus 52%.

ZINC

Sheet, 16.50c-17.00c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 15.25c-16.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 14.25c; over 12-in., 15.25c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 54.00c. Strip, cold-rolled, 60.00c. Rods, hot-rolled 50.00c, cold-finished 55.00c. Angles, hot-rolled, 50.00c. Plates, 52.00c. Seamless tubes, 83.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 43.00c; No. 35, 41.00c. Strip, cold-rolled, 44.00c. Rods, hot-rolled 39.00c; cold-finished 44.00c. Angles, hot-rolled, 39.00c. Plates, 41.00c. Seamless tubes, 71.00c. Shot and blocks, 31.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.625	15.375	14.750
Commercial Bronze			
95%	18.125	17.875	17.375
90%	17.625	17.375	16.875
Red brass			
85%	17.500	17.250	16.750
80%	17.250	17.000	16.500
Best Quality (71-79%)	16.625	16.375	15.875
Muntz Metal	14.750	14.500	14.000
Nickel silver, 5%	16.500	16.250	8.250
Phos. bronze, A. B.	20.750	20.500	19.500
Naval brass	15.250	15.000	14.500
Manganese bronze	15.250	15.000	14.375

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00, No. 2 copper 17.00, light copper 16.00, composition red brass 15.25, auto radiators 12.25, heavy yellow brass 11.25, brass pipe, 12.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 19.00, No. 2 copper 18.00, light copper, 17.00, refinery brass (60% copper), per dry copper content 16.75-17.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 16.75-17.00, No. 2 15.75-16.25, light copper 14.75, No. 1 composition red brass 13.00-13.50, No. 1 composition turnings 12.50-13.00, mixed brass turnings 7.75-8.00, new brass clippings 12.50-13.00, No. 1 brass rod turnings 10.00-10.50, light brass 6.75-7.25, heavy yellow brass 9.25-9.75, new brass rod ends 10.50-11.00, auto radiators, unsweated 10.00-10.50, cocks and faucets 10.25-10.75, brass pipe 10.25-10.75.

Lead: Heavy 15.00-15.25, battery plates 9.25, linotype and stereotype 16.00-16.50, electrotype 13.50-14.00, mixed babbitt 14.25-14.75, solder joints, 17.25-17.75.

Zinc: Old zinc 5.50-5.75; new die cast scrap 4.75-5.25, old die cast scrap 2.75-3.25.

Tin: No. 1 pewter 60.00-62.00, block tin pipe 77.00-78.00, auto babbitt 46.50-47.00, No. 1 babbitt 46.50-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings 2S 9.50-10.00, old sheets 7.00-7.50, crankcases 7.00-7.50, borings and turnings 2.50-3.00, pistons, free of struts, 7.00-7.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
March Average:	21.500	14.825	12.000	94.000	15.000	33.000	33.750	74.625
Apr. 1-3	21.500	14.80-14.85	12.000	94.000	15.000	33.000	33.750	74.625
Apr. 5-22	21.500	17.30-17.35	12.000	94.000	15.000	33.000	33.750	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Busheling	40.00-40.50*
Nos. 1, 2 & 3 Bundles	40.00-40.50*
Machine Shop Turnings	36.00-36.50
Mixed Borings, Turnings	36.00-36.50
Short Shovel Turnings	36.50-37.50
Cast Iron Borings	36.00-37.00
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Heavy Turnings	40.50-41.00

Cast Iron Grades

No. 1 Cupola	65.50-66.50
Charging Box Cast	48.00-49.00
Heavy Breakable Cast	48.00-49.00
Unstripped Motor Blocks	52.00-53.00
Malleable	69.00-70.00
Brake Shoe	52.00-53.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.00-41.50
R.R. Malleable	75.00-80.00
Axles	51.50-52.00
Rails, Rerolling	56.00-57.00
Rails, Random Lengths	60.00-61.00
Rails, 3 ft and under	61.50-62.00
Rails, 18 in. and under	62.50-63.50
Railroad Specialties	54.00-55.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	46.00-49.00

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	68.00-70.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast	54.00-56.00
Unstripped Motor Blocks	58.00-60.00
Malleable	73.00-78.00
Brake Shoes	52.00-53.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	58.00-60.00
Burnt Cast	56.00-57.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	73.00-78.00
Rails, Rerolling	57.00-58.00
Rails, Random Lengths	56.00-57.00
Rails, 3 ft and under	61.00-63.00
Cast Steel	56.00-58.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	57.00-59.00

* Plus applicable freight springboard.

VALLEY

No. 1 Heavy Melt. Steel	$40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	46.00-47.50

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$35.00-35.50
Short Shovel Turnings	37.00-37.50

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50
R.R. Malleable	68.00
Rails, Rerolling	53.00
Rails, Random Lengths	50.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	40.00-40.50

Cast Iron Grades

No. 1 Cupola Cast	60.00-62.00
Heavy Breakable Cast	50.00-52.00
Clean Auto Cast	62.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.00-44.00
No. 2 Heavy Melt. Steel	39.75-40.25
No. 1 Busheling	39.75-40.25
No. 1 & 2 Bundles	39.75-40.25
Machine Shop Turnings	34.75-35.25
Mixed Borings, Turnings	34.75-35.25
Cast Iron Borings	35.25-35.75
Short Shovel Turnings	35.25-35.75
Low Phos.	44.75-46.00

Cast Iron Grades

No. 1 Cupola	62.50-63.50
Mixed Cupola	58.00-60.00
Heavy Breakable Cast	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under	56.00-58.00
Railroad Specialties	52.00-53.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$41.50-42.50
No. 2 Heavy Melt. Steel	39.00
No. 1 Busheling	39.00
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Machine Shop Turnings	34.00-35.00
Mixed Borings, Turnings	34.00-35.00
Short Shovel Turnings	34.00-35.00
Bar Crop and Plate	44.50-45.50
Punchings & Plate Scrap	44.50-45.50
Cut Structurals	44.50-45.50
Elec. Furnace Bundles	43.50-44.50
Heavy Turnings	42.50-43.00
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola Cast	62.00-64.00
No. 1 Machinery Cast	66.00-67.00
Charging Box Cast	61.00-62.00
Heavy Breakable Cast	61.00-62.00
Unstripped Motor Blocks	59.50
Malleable	74.00-76.00
Clean Auto Cast	62.00
No. 1 Wheels	67.00-68.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.03
No. 2 Heavy Melt. Steel	34.03
No. 1 Busheling	34.03
Nos. 1 & 2 Bundles	34.03
No. 3 Bundles	32.03
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings	30.50-31.00
Punchings & Plate Scrap	39.00-40.00
Cut Structurals	39.00-40.00
Elec. Furnace Bundles	39.00-40.00

Cast Iron Grades

No. 1 Cupola Cast	54.00-56.00
Charging Box Cast	54.00-55.00
Heavy Breakable	54.00-55.00
Unstripped Motor Blocks	51.00-53.00
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.40-31.90
No. 2 Heavy Melt. Steel	31.40-31.90
No. 1 Bundles	31.40-31.90
No. 1 Busheling	31.40-31.90
Machine Shop Turnings	26.90
Mixed Borings, Turnings	26.90
Short Shovel Turnings	28.90
Bar Crops and Plate	35.00-37.00
Punchings & Plate Scrap	35.00-37.00
Chemical Borings	34.00-35.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-60.00
Heavy Breakable Cast	50.00-53.00
Stove Plate	52.00-55.00
Unstripped Motor Blocks	48.00-49.00
Clean Auto Cast	48.00-50.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
No. 1 Bundles	39.00-39.50
No. 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings	36.00-36.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	46.50-47.00
Punchings	48.00-48.50
Elec. Furnace Bundles	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	68.00-70.00
Clean Auto Cast	68.00-70.00
No. 1 Wheels	57.00-60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	41.25-41.75
Malleable	74.00-77.00
Rails, Rerolling	49.00-50.00
Rails, Random Lengths	48.00-49.00
Rails, 3 ft and under	55.00-56.00
Rails, 18 in. and under	57.00-58.00
Railroad Specialties	49.00-50.00
Angles, Splice Bars	51.00-52.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$39.50-40.50
No. 2 Heavy Melt. Steel	37.50-38.50
Machine Shop Turnings	32.50-33.50
Short Shovel Turnings	34.50-35.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-67.00
Mixed Cast	60.00-62.00
Heavy Breakable Cast	55.00-56.00
Brake Shoes	54.00-55.00
Clean Auto Cast	65.00-67.00
Burnt Cast	58.00-59.00

Railroad Scrap

R. R. Malleable	65.00-70.00
Rails, Rerolling	50.50-52.50
Rails, Random Lengths	49.50-51.50
Rails, 3 ft and under	53.00-55.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	48.00-50.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	26.00
No. 1 Busheling	26.00
Nos. 1 & 2 Bundles	22.00-23.00
No. 3 Bundles	22.00-23.00
Machine Shop Turnings	14.50-16.50
Mixed Borings, Turnings	14.50-16.50
Punchings & Plate Scrap	26.00-28.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	25.00
Heavy Breakable Cast	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	28.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-48.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

Sheets, Strip . . .

Carryover of unfilled business at end of this quarter to show substantial increase

Sheet Prices, Page 146

New York — While sheet producers are uncertain as to where they stand as a result of the disruption in operations due to the coal strike, they are endeavoring to set up at least tentative third-quarter quotas by May 1. The sooner they get organized themselves and the sooner their customers can obtain some idea as to what they can expect, the better off the situation will be. Between now and July 1, there may be new developments pertaining to the defense program, European aid requirements and special domestic needs, but producers figure they will at least have some tentative foundation on which to build.

All major grades of sheets are in tight supply, with even some further tightening in stainless steel. Except for No. 2-B finishes, which can be had for fairly nearby delivery, stainless sheets are difficult to obtain in less than eight to nine weeks, with some producers having little to offer before third quarter.

Electrical sheet deliveries are again tightening. A while back there was a drop in demand and some actual cancellations as a result of reduction in output of oil burners, which in turn caused a cut in demand for transformers. However, although production of oil burners is still restricted, there has been a stepping up in demand in other directions which has placed electrical sheet supply back just about where it was several months ago.

Pittsburgh — Not all producers have raised their Detroit arbitrary prices on sheets and strip in line with the $1 advance put into effect recently by Great Lakes Steel Corp. However, some such action is expected momentarily. Output has been relatively little affected to date due to cutback in primary steel production resulting from coal strike. Pressure for sheet and strip deliveries has been heavier in recent weeks, reflecting effort of consumers to obtain their allotments in advance of possible curtailment in production.

Effective on shipments on or after Apr. 19, Armco Steel Corp., Middletown, O., increased its arbitrary freight rates on shipments into Detroit and Eastern Michigan in line with the higher prices recently announced by Great Lakes Steel Corp., Detroit.

At least one steel producer is now charging a 25-cent extra when special killed steel is acquired to meet deep drawing specifications of customers' orders for specific applications. It has been the general practice of the industry to charge 25 cents extra when the customer specifies deep drawing quality and it was left up to the discretion of the producer whether or not the end use required a special killed steel. The extra 25 cents for special killed steel, however, has not been charged when the customer originally specified drawing quality only.

Philadelphia — Some sheet sellers are planning to blank out July quotas in an effort to bring deliveries in the third quarter as nearly current as possible. Certain producers, however, claim they will have arrearages at the beginning of the quarter which will amount to about six weeks production and that situation, combined with vacation lags particularly in July, will throw them even further behind. However, they figure that blanking out at least one month will be a good help.

Cleveland — In view of production losses from the recent coal miners' strike and effects of forthcoming summer vacations, July order quotas for flat-rolled carbon steel have been reduced by Republic Steel Corp. In some instances, quotas are cut in half.

Although Republic has lost little or no production of flat-rolled carbon steel because of the coal strike it is confining its efforts to common grades rather than trying to make special qualities which require higher fuel consumption.

Cincinnati — Sheet mill interests here are concerned chiefly with loss of tonnage through shutdowns caused by an Ohio river flood. Complete shutdowns were necessary at Newport, Ky., works of the International Detrola Corp., with loss of more than two weeks output, and at the Ashland, Ky., plant of Armco Steel Corp., expected to resume after a 10-day loss. Neither the coal miners' holidays nor flood conditions affected production in Middletown and Hamilton. Mills are receiving numerous inquiries linked with the national defense program but orders have not been heavy.

St. Louis — Sheet and strip demand here is unremitting with production hovering about 50 per cent of capacity. Bottleneck is Granite City Steel Co.'s new cold reduction mill which is held to half speed by trouble with accessory equipment. Only seven of its 13 furnaces have been on recently, but the ingot output of these is more than enough for present rolling speed. Coils are being piled behind cleaning and shear lines until the difficulties can be remedied. Capacity operations are expected by the third quarter. Order books are filled to that date, even though second quarter schedules never were formally opened.

Wire . . .

Wire Prices, Page 147

Pittsburgh — Output of merchant and manufacturers' wire items recorded slight improvement last week, with one large interest gradually resuming production after being shut down for a week. Pattern of demand for wire has recorded little change, with the demand-supply situation in merchant quality items said to be most critical. Supply of spring wire is somewhat improved, reflecting easing requirements for bedsprings, etc. Wire rod output was drastically curtailed during the coal strike period, with the result that some nonintegrated interests were forced to curtail their finishing operations.

Nearly every phase of wire production has been augmented at the Aliquippa Works of Jones & Laughlin Steel Corp. with new equipment and additional facilities effecting an appreciable increase in capacity and considerable improvement in the quality of wire products. Company soon will complete installation of 55 wire drawing machines. Fourteen new nail machines are in operation and these are the first of 120 units to be installed.

Steel Bars . . .

Some producers will blank out one month's quotas in third quarter

Bar Prices, Page 146

Philadelphia — Bar demand continues well in excess of supply and, while there is expected to be a steady increase in production from now on for a while, the carryover into next quarter likely will be heavier than it was at the beginning of April. In some instances, a month will be blanked out in the next quarter so as to bring about a better balance with respect to delivery promises. Loss of tonnage due to the coal strike will be felt for some time, particularly in cold drawn bars which require added processing. The effect of the recent disruption in cold-drawn bar shipments was reflected later than in hot bars and probably will continue to be seen after a return to normal has been witnessed in hot tonnage. Unless there is further delay on the part of large segments of miners in returning to work, it appears probable that most mills will be able to set up tentative consumer quotas for third quarter by May 1, or shortly thereafter.

New York — Cold-finished bar deliveries are becoming more extended due mainly to the coal strike. Some sellers will return to a quarterly quota basis. Until recently the cold drawers have been able to maintain schedules, despite the slowing up in mill shipments, by drawing on inventories. Because of the processing involved, the effect of the recent disruption may be witnessed later than in most other types of bars.

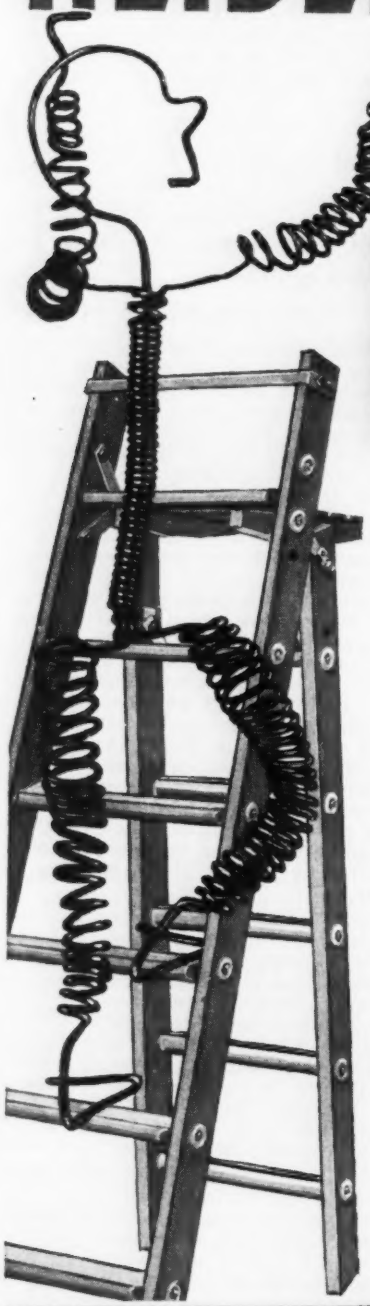
Most consumers of hot bars look for a further shrinkage in supply for some time to come. Demand is expected to broaden as a result of the defense program and European aid requirements and production, while likely to improve over coming weeks, is scheduled for a set-back during the summer vacation season. Alloy bar demand is gradually increasing, with one eastern producer having set up consumer quotas for the current period. This was the first move along this line since the war.

Tubular Goods . . .

Tubular Goods Prices, Page 147

Seattle — Inquiry for cast iron pipe is slow as buyers show little interest in 24-month deliveries which is the best agencies can promise at present. Competing types can offer better inducements and have been bought by several users who otherwise would prefer cast iron. The largest inquiry pending is at Spokane which will open bids Apr. 29 for 114,000 feet, in excess of 2000 tons.

HEIDER* Ladder Rungs are reinforced with KEYSTONE WIRE



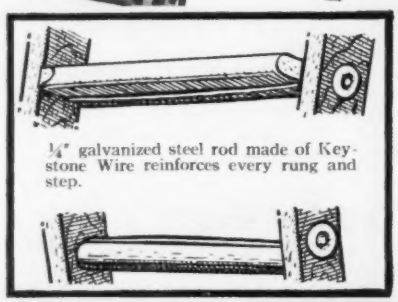
The 2-Way Step and Straight Ladder, is one outstanding example of Heider ladder construction. Every step and rung is reinforced with a ¼" galvanized steel rod made from Keystone Wire . . . greatly increasing the strength under load and giving a wide margin of safety.

An important reason why the Heider people achieve and maintain leadership in their field is the extra care with which they select materials.

Keystone cold-heading wire is the choice of this manufacturer because of its cold upsetting and threading qualities. Controlled manufacturing practices . . . plus rigid mill tests and inspections . . . give Keystone Wire the internal soundness, uniformity of chemical composition and freedom from injurious surface defects necessary for precision manufacturing techniques.

We are indeed proud that Keystone Cold-heading Wire is a recognized factor in the structural soundness of Heider ladders.

** Heider Manufacturing Co. Carroll, Iowa*



¼" galvanized steel rod made of Keystone Wire reinforces every rung and step.

KEYSTONE MUSIC SPRING WIRE

SPECIAL ANALYSIS WIRE for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

Tin Plate . . .

Proposed export allocations for third quarter lower than for current period

Tin Plate Prices, Page 147

Washington — Rated export allocation of 108,000 net tons of tin plate to be shipped during the third quarter of 1948 has been proposed by the government. An additional 12,000 tons of tin plate may be licensed on a non-rated basis. The proposed quantity to be licensed in the third quarter represents a reduction of 4000 tons from the second quarter for rated tonnages and 1000 tons for non-rated tonnages.

Approved foreign orders are supported by Certified Export Steel (CXS) priority ratings, and must be accepted by American tin plate producers. Rated tonnage will be licensed only for use in connection with preservation of essential foodstuffs intended for consumption abroad.

Of the tin plate to be licensed on a non-rated basis, 5000 tons would be for the packing abroad of foodstuffs to be imported into the United States and 7000 tons would be for uses permitted by order M-43, including use abroad by American petroleum companies. Licenses for the 7000 tons will be restricted to electrolytic tin plate (maximum 0.50 lb coating) or special manufacturing ternes.

Government officials re-emphasized the need for fullest possible co-operation of the tin plate industry in continued maximum effort in delivery of foreign tin plate rated commitments, pointing out that the program as approved still falls short of the objectives desired in connection with foodstuff preservation abroad. It was stated that there has been no material improvement in tin supply, and that the use of tin during 1948 must be restricted to about the same amount used in 1947. As a result of the slightly increased tin plate quotas during the first half of this year, there will be less tin available to the industry during the second half.

Of the 108,000 tons of rated tin plate, 33,064 tons will be allocated to Latin American countries and the balance to non-Latin American countries, with a contingency reserve of 36 tons. Ten largest country quotas for the third quarter are as follows: Australia, 10,500 tons; Netherlands, 9500 tons; Brazil, 9400 tons; Argentina, 8500 tons; South Africa, 6300 tons; Norway, 4700 tons; Cuba, 4500 tons; Belgium, 4500 tons; Sweden, 3750 tons; and French North Africa, 3600 tons.

Pittsburgh — Tin plate sellers believe that monthly export tonnage will not be substantially increased as a result of the ERP, rather a redistribution will probably occur. Output of tin mill products has held up very well to date this year in sharp contrast to a number of other finished steel products. Producers are not expected to have much carryover tonnage on their books at the start of the third quarter. By specifying 1/4-pound coating, beer container manufacturers have been able to increase their tin plate orders and still remain with order M-81's restrictions.

Plates . . .

Harrisburg producer raises prices $7 a ton on plain carbon plates

Plate Prices, Page 147

New York — Plate producers continue to fall behind on their schedules. They look for improved operations, assuming no further disruptions, but believe third quarter carryover will be heavier than at the beginning of the current period. Improved scrap supply and other favorable seasonal operating factors will be a help in bringing production eventually up to a point which should exceed the pre-coal strike rate of operation; however, too much tonnage was lost during the strike to enable most mills to overcome this handicap.

Boston—Margin of demand over supply of plates has widened with inventories low, notably in smaller sizes. Heavier plates required for weldments also are more extended. Plate demand for weldments, tanks and miscellaneous product fabrication holds up well, while shipbuilding needs are developing. Four super-tankers to be built at the Bethlehem Fore river yards, Quincy, Mass., will require close to 35,000 tons of plates and shapes.

Philadelphia — One eastern plate mill has started entering orders for the third quarter; others may take similar action before the week is over, setting up their allocations on a tentative basis, pending further developments with respect to defense work, foreign aid and, in particular (with regard to industry requirements), the pressing needs of the oil industry.

The Harrisburg, Pa., producer has advanced plain carbon plates $7 a ton to a price equivalent to 5.10c per pound, basing points.

Structural Shapes . . .

Structural Shape Prices, Page 147

Boston—Structural steel fabricating shops are forced to gear estimates and bookings more closely to potential allocations of plain material which are barely maintained. Efforts to obtain increases in quotas to cover additional shop work generally fail. Considerable July tonnage will be blanked out, reducing quotas for the third quarter. Warehouses have little structural tonnage. While 1200 tons are required for an addition to Pratt & Whitney's plant at Hartford, Conn., and while there has been an increase in small-lot public building demand, industrial inquiry generally is slack. Industrial construction costs have advanced to a range of $10 to $12 a square foot compared with $4 a square foot in the prewar period.

Bids close this week on 3100 tons for the superstructure, Augusta, Me., bridge.

New York — District fabricators report a slowing up in demand. The situation, they say, is substantially less active than a month ago. Among a few outstanding orders is a lot of 1500 tons for the Hillman Housing development in Grand St., placed with Harris Structural Steel Co., this city.

Philadelphia — Structural demand

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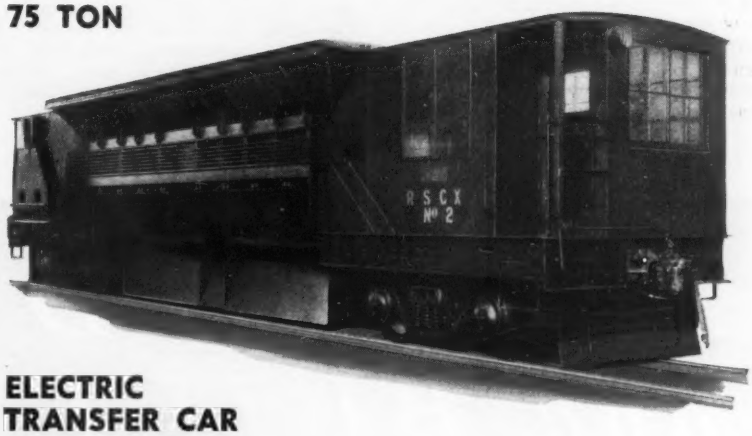

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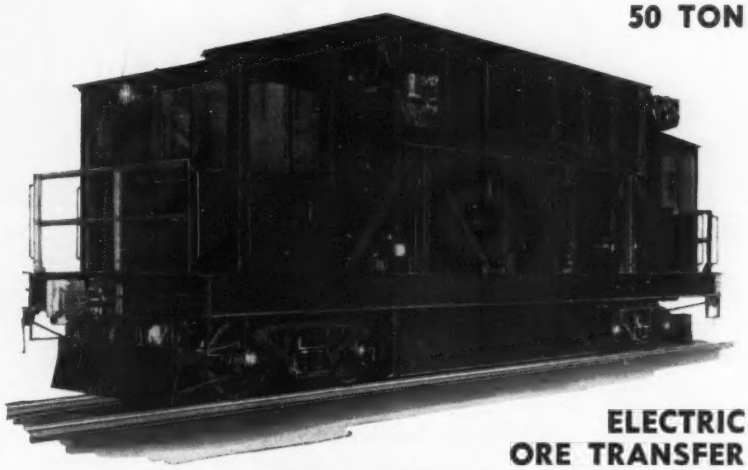

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is the lightest in some time, with orders scattered and new inquiries comprised almost entirely of small tonnages. Excessive building costs continue to hold up considerable work. However, shape supply is tight and many of the smaller buyers, particularly those who rely on warehouses for substantial percentages of their requirements, are complaining bitterly over their inability to get steel. Enforced curtailment of shape production recently because of the coal strike has added to the stringency, although some units which were down are now back in operation.

Seattle — Fabricators find it increasingly difficult to maintain normal operations in view of the scarcity of materials, aggravated by the coal strike which resulted in additional delay of shipments. Inventories are extremely low and it is impossible for plants to make commitments beyond current supplies. The largest project pending involves 615 tons for bus structures at Coulee east switchyard. Seattle's proposed viaduct will require 9850 tons shapes but the bid date has not beet set.

Seattle — Plans are completed and funds are available for Seattle's proposed $3 million Alaskan Way traffic viaduct. Bids will be called after further hearings on protests. The main structure will be 8070 feet in length, side ramps 1453 feet. Steel quantities required are: Shapes, 9850 tons; reinforcing bars, 3250 tons; steel piling, 2600 tons.

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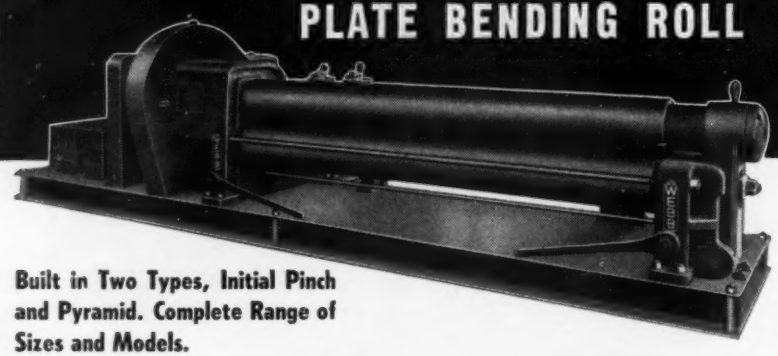

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 146

Seattle — Continued inquiries for small tonnages for schools, industrial plants and miscellaneous construction feature the reinforcing bar market. Rolling mills are operating at capacity and are making little headway against substantial backlogs.

The largest job immediately pending totals 300 tons for an addition to the Port of Tacoma cold storage plant, general contract awarded. Bids have been rejected for the Seattle library addition, involving about 700 tons reinforcing.. Montana will open bids for three steel and concrete bridges, steel quantities unstated.

Semifinished Steel . . .

Semifinished Prices, Page 146

Pittsburgh — Nonintegrated steel interests report sharp decline recently in mill shipments of semifinished steel, including wire rods, tube rounds, billets, blooms and slabs. Integrated producers have attempted to distribute the overall loss in semifinished steel production as evenly as possible among their customers and for use for further internal conversion to finished steel items. However, under recent reduced ingot production schedules, integrated interests have had to utilize as much steel as possible to prevent shutdown of some of their finishing mills. Some sellers have limited order acceptance for July, August, and September in line with allowance for vacations, mill breakdowns, and tonnage lost during the period of industrial gas shortage earlier this year. Tonnage loss developing out of the coal strike will not be made up until fourth quarter.

Warehouse . . .

Warehouse Prices, Page 149

Pittsburgh — Steel distributors report moderate reduction in mill shipments in recent weeks, but have correspondingly reduced shipments on customers' accounts. Therefore warehouse stocks have recorded little change. Full impact of reduced mill production schedules is expected to be experienced over the next four to six weeks. Many metalworking companies have attempted to supplement their steel supplies via warehouse sources with little success. Distributors have difficulty in obtaining needed supplies of cold-finished bars, with producers' order backlogs now extended from three to six months. Alloy bar demand also has shown improvement, but not to the extent of cold finished. Stainless steel items continue in fairly good supply. Most critical items insofar as supply and heavy demand continue to be plates, shapes, sheets, merchant wire items, and small size bars.

Cincinnati—Several important steel jobbers suspended deliveries for two weeks because of the Ohio river flood, throwing an extra burden on other interests in a market where the demand is far beyond supply. Inventories are shrinking as mill shipments reflect the effects of the coal miners' strike.

Scrap . . .

Price tone continues to strengthen in Chicago. Railroad grades higher

Scrap Prices, Page 152

Chicago — Scrap market here continues to firm but only price increases have been in a few railroad grades. A recent purchase of open-hearth material by an important mill on the basis of $39.50 a gross ton delivered for No. 1 heavy melting steel reaffirmed for the present the price schedule which has been in effect for several weeks. To hold steelmaking at the highest possible level in view of short coal stocks, mills are using more scrap to offset loss of blast furnace metal. Likewise, foundries are melting more scrap to make up for shortage of pig iron. Scrap is flowing to consumers in good volume, although overall supply is not as plentiful as desired.

Pittsburgh — Mills are expected to follow the established policy of absorbing the latest freight advance on remote scrap shipments under old contracts. Freight rate advances since last fall represent an increase of about $2 a ton on rail charges covering scrap shipments originating in New England.

Steel producers are expected to follow a wait-and-see policy before making large tonnage commitments pending resumption of full-scale coal mining operations. Most mills have been able to substantially augment scrap inventories during the recent period of curtailed ingot operations despite the fact that flow of scrap has been restricted somewhat due to the limitations on the movement of steam freight hauls. Very little tonnage remains unshipped on large-tonnage commitments placed at formula prices. New buying represents only small lot transactions and consists primarily of local scrap, except from reciprocity sources. Some efforts have been made to negotiate commitments at prices below formula levels but without success to date.

Upward trend in cast scrap prices appears to have leveled off due to depletion of coke stocks which has forced many foundries to either shut down or substantially curtail operations. Success of the railroad scrap drive is reflected in large tonnages offered on recent lists.

New York—Brokers' buying prices continue steady, with scrap coming out freely and being absorbed as fast as it becomes available. Some consumers of heavy melting steel in both Pittsburgh and eastern Pennsylvania find quality of some shipments below standard, but for most part are taking material in at lower prices rather than reject it outright.

Philadelphia — Scrap continues to move more freely, with prices on two grades of cast down from a week ago. No. 1 cupola and clean auto cast are now holding at a flat level of $62, delivered, although small lots continue to move at varying prices. However, charging box and heavy breakable grades are up slightly to a spread of $61 to $62.

Steel scrap continues unchanged throughout the list, although there are continued complaints concerning

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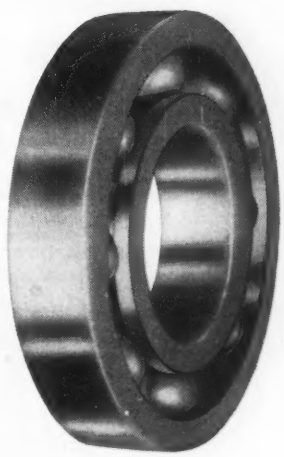

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the quality of No. 2 heavy melting steel in particular. There has been an increasing number of rejections as a result. Considerable light scrap is coming out these days, indicating special activity on the part of collectors.

Cleveland — Reduction in steel output owing to a shortage of fuel has taken some of the recent strength out of demand for open-hearth grades of scrap, and growing scarcity of pig iron and coke have also continued an easing in demand for foundry grades. Prices on all grades remain unchanged.

Curtailment this week of fabricating operations in General Motors Corp. plants because of insufficient steel is expected to make a noticeable reduction in the amount of scrap available for steel mills.

Buffalo — Steady to stronger tendencies pervade the scrap market despite a sharply lower ingot rate. Dealers are hesitant about accepting fresh orders at the formula price because midstate sales to an outside consumer at $2 above the formula are cutting into local supplies. In addition the government sold 4800 tons of tractor treads at its Romulus station at $42.15 a ton, fob shipping point, which is equivalent to $46.05 a ton delivered Buffalo. This material is considered No. 1 material, but compares with a top formula price of $39.75 a ton for steelmaking grades here. In view of these sales dealers are a bit wary of taking on additional orders at the formula.

Another bullish factor on the price side is the rather limited flow of material. Water receipts, however, are expected to replenish mills' stockpiles in the near future. About 4000 tons are awaiting shipment from the seaboard via the canal by barge for a local mill. While no scrap boats are enroute here, between 30,000 and 40,000 tons are reported in Duluth-Superior yards awaiting shipment.

With the exception of short shovelings, turnings are moving on the formula basis. The refusal of one of the top mills to take in shovelings at a price above regular turnings has weakened the market for shovelings, which are quoted $1.25 to $1.50 under the formula.

Cast scrap also shows easier tendencies, but is unchanged from the previous week's lower prices.

Watervliet, N. Y. — Procurement section, Watervliet Arsenal, will open bids May 3 for disposal of the following scrap: 20 tons of miscellaneous iron and steel scrap; 50 tons, heavy prepared steel scrap; 20 tons of structural steel; 10,000 pounds, brass chips and turnings; 5000 pounds, clean brass; and 1000 pounds dirty brass.

Cincinnati — Scrap prices are holding firmly as abnormal conditions afflict the district. Armco Steel Corp.'s three blast furnaces and the company's open hearths at Ashland, Ky., are down because of an Ohio river flood. No melting is being done in Newport, Ky. A blast furnace at Martins Ferry, O., supplier to Newport, has been banked through lack of coke. All are expected to resume soon. Conditions have not cut demand for scrap even though conditions delay delivery. Less scrap has been coming out, due to temporary handicaps.

St. Louis—Despite steadily improv-

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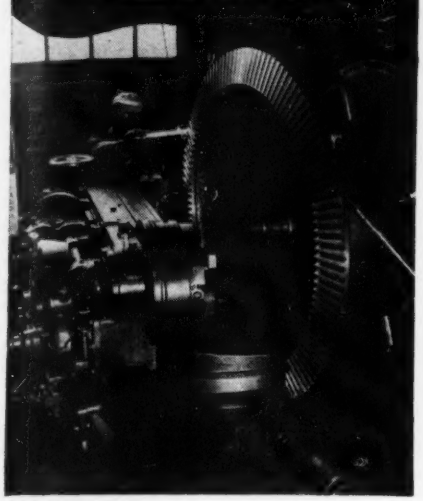

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ing shipments, scrap prices have held steady here. Melters are laying scrap on the ground, but none are in too comfortable a position yet. Tonnage moved rather well all winter; hence, there is no spring rush. Nevertheless, melters want to build inventories near the 90-day mark before attempting price-depressing withdrawals from the market. They don't want to do anything that might stop the flow and create more production uncertainties. Cast scrap prices were a trifle stronger during the coal strike as melters sought to stockpile a pig substitute in case iron output dropped off sharply. Rail scrap prices are expected to stiffen slightly soon with an 8000-ton offering by the Louisville & Nashville railroad.

Seattle — The scrap situation is greatly improved and current shipments are in excess of consumption. Inventories are gradually increasing. Better weather and the availability of more freight cars, released by the eastern coal strike, are the leading factors in the improved situation. The price remains firm at $26 per gross ton for No. 1 heavy.

Although foundries are using more cast iron scrap, due to the scarcity of pig iron, scrap receipts are increasing. Withdrawal of eastern interests from this area, due to the coal strike, has increased pressure on the market and dealers are shipping to local plants where the price continues steady at $40. The pig situation has been aggravated by the closing of the Geneva furnaces on account of a lack of coke. It is reported that Geneva is about to reopen but it will be several weeks before shipments can be expected in this area.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 148

Washington — Production of coke from coal-gas retorts in the United States declined 12 per cent in 1947 to 664,576 tons, according to the Bureau of Mines. This sharp decrease, in spite of extremely heavy demand for gas, was due principally to the substitution of water-gas, natural gas, and liquefied petroleum gas for coal gas at a number of installations. There has been a definite acceleration in conversion since the war and, in 1947, 2 plants converted from coal gas to natural gas and 16 plants to propane-air or a mixture of propane-air and water-gas. This replacement of coal gas resulted in the dismantling of 729 retorts in 1947 thereby reducing the total number of retorts of all types in existence at the end of the year to 1419. Of these only 1154 were active on Dec. 31, 1947.

The steady recession of plants operating coal-gas retorts has reduced the coal carbonizing capacity of the industry to 1,273,100 net tons as of Dec. 31, 1947, or a decrease of 21 per cent from 1946 and 33 per cent from 1942. Based on installations in existence at the end of the year, the industry operated at 86 per cent of capacity in 1947 compared with 77 per cent in 1946.

Quantity of coal carbonized decreased 12 per cent from 1946 but the average cost of coal at producing plants increased $1.15 per ton, or 16 per cent. This gain was due largely to the increases in mining and transportation costs.

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Pig Iron . . .

Pig Iron Prices, Page 148

Philadelphia — District pig iron producers are moving cautiously in returning to normal production. They have drawn upon their inventories extensively during the recent disruption and wish to make sure that replenishments are freely available again before stepping up production too rapidly.

The Swedeland, Pa., producer does not expect to be able to resume shipments to the merchant trade before May 1; and that is assuming there will be a full return of miners to work by the beginning of this week. At present, this producer has been operating on reduced draft, with just enough tonnage being produced to meet its own steel mill requirements. When this seller does resume shipments again to the outside trade, it will be in basic. This producer will have to deliver foundry coke on a more limited basis than contemplated prior to the coal strike. A program of repairs to one unit was scheduled, but it is found now that still further work will be necessary on some ovens which had previously been repaired.

Shortage of pig iron and coke will be reflected in foundry operations for some time, with indications that the situation may become worse before it improves, this being particularly true in regard to coke. Some district foundries, it is understood, plan to take the occasion of the American Foundrymen's convention in Philadelphia, May 3-7, to suspend operations completely, thus hoping to get caught up a bit on inventories and at the same time providing their employes with the opportunity of taking in the exhibits and various sessions connected with the convention.

Question still attends the disposal of the government owned blast furnace at Chester, Pa. While the Philadelphia district office of WAA recently announced the sale to Atlas Steels Inc., Wilmington, Del., it appears that the Washington office of this agency had also entered into certain commitments with another prospective purchasing group, reported to be the Mariemont interests of Chicago. According to word from Washington, there are still some legal technicalities that have to be considered. Further, there is question as to whether or not the White House directive of Apr. 8, affecting the sale of surplus plants, might not throw a monkey wrench into recent negotiations.

Pittsburgh — Many foundries have been forced to use up to 95 per cent cast scrap in melting operations to offset the critical pig iron shortage. Merchant iron output in this area still remains well below 50 per cent of normal, with result a number of foundries have been forced to shut down despite the use of much larger proportion of cast scrap. In recent weeks, supply of coke has become just as critical as that of pig iron, with some foundries attempting to use beehive furnace coke. There were about seven blast furnaces in this area still idle near the close of last week because of the coal shortage. Foundry operations have been further affected by the poor quality and limited supply of cast scrap and coke.

Boston—While melt at some of the smaller foundries is slightly lower, this is balanced by increases at several larger shops; one, in the Providence, R. I., district, is going to three shifts. Supply of pig iron is limited largely to Everett, Mass., production. Ratio of scrap to pig iron in melts is high, even with small shops which normally take less than 50 tons a month. There are probably around 150 foundries in New England in this latter category. On the other hand, several large foundries require as much iron per month as those in the entire smaller group.

Cleveland — Merchant iron supplies continued to shrink last week as a result of the coal miners' work stoppage, and this handicap, along with the dwindling of coke supplies, is making foundry operation increasingly difficult.

Because of lack of coke Republic Steel Corp. is shipping no merchant iron from Cleveland, and American Steel & Wire Co.'s merchant iron production was interrupted a few weeks ago by necessity of taking off one stack for relining.

While foundry production is being severely interfered with, the coal strike effects are expected to relieve foundries of some pressure for deliveries, for it is believed an increasing shortage of steel will reduce the need for castings.

However, with pig iron inventories being exhausted, foundries are expected to exert an exceptionally heavy demand for immediate shipments once iron production becomes normal again.

Chicago — While several blast furnaces have resumed production following the coal strike, foundries are going to lack adequate pig iron supplies for several weeks. Some of this shortage can be offset by an increase in scrap use. However, the principal factor which will control operations will be shortage of foundry coke. Foundries are pegging their schedules to available raw materials by closing down half days or dropping shifts as necessity requires. Of the district's 41 blast furnaces, 35 are operating. Two furnaces banked on account of the coal strike have not yet resumed. Wisconsin Steel Co. on Apr. 18 relighted its South Chicago No. 2 furnace taken out Feb. 29 for relining. Youngstown Sheet & Tube Co. also has restored wind to Indiana Harbor No. 2 stack down for relining since Mar. 1.

Buffalo — With the coal outlook still uncertain district pig iron producers were unable to recoup recent output losses as production remained at 75 per cent of capacity. The pig iron pinch became more intense as additional foundries slahed output. The curtailment in foundry operation was reflected in the cast scrap market where an easier tone was attributed to a lessening in demand from foundries which have been unable to obtain a proper pig iron mixture. Bethlehem's Lackawanna mill has two idle furnaces as a result of the coal tieup. The mill will make no attempt to resume production in these units until ample coal supplies are assured. Hanna is taking advantage of the coal situation to reline one of its four units. A merchant iron producer, the Hanna stack will be down for several weeks.

Cincinnati—Foundry operations in

this district are light, due to shortage of pig iron and coke. Shipments of merchant iron have virtually ceased, and a river flood halting barge transportation aggravates the pinch in coal supplies traced to the miners' idleness. One blast furnace, on basic hot metal, was producing, one is being relined, and three others banked because of the high Ohio river.

Birmingham—Restoration recently of idle blast furnaces by merchant iron producers has boosted the general feeling in pig iron circles measurably. All furnaces and mills idled by Mar. 15 strike in the Birmingham district were back in production early this week.

St. Louis — Pig iron production in this district remains at 80 per cent of capacity and is unlikely to improve before May 1. Coke oven operations dropped to 60 per cent but are picking up some now. Coke capacity will not be reached until shipments of coal from West Virginia resume. Southern Illinois coal was substituted during the strike, but the quality reduced coke output. The 20 per cent iron deficit was apportioned among customers. Even though few were able to obtain additional tonnage elsewhere, and complaints were numerous, there is no evidence mills or foundries here suffered seriously.

Iron Ore . . .

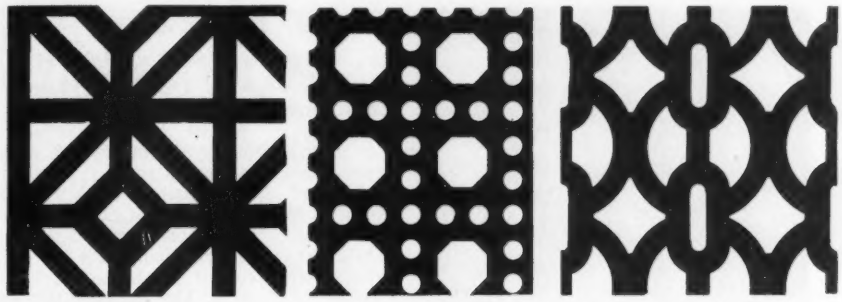
Iron Ore Prices, Page 148

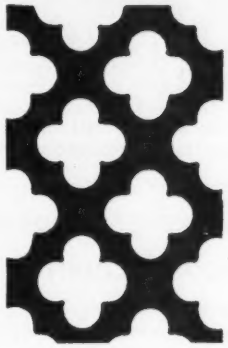
Cleveland — Lake Superior iron ore shipments increased to 2,242,107 tons during the week ended Apr. 19 from 1,298,629 tons for the preceding week, making the season's total 3,603,528 tons compared with 1,361,421 tons for the like 1947 period, according to the Lake Superior Iron Ore Association, this city. Shipments from United States ports alone totaled 2,226,329 tons, or at an average daily rate of 318,047 tons, compared with 1,038,804 tons, or a daily average of 148,400 tons, for the like week a year ago. No shipments have been reported so far this year from Port Arthur, all Canadian shipments, totaling 20,750 tons for this season to Apr. 19, having originated at Michipicoten.

Consumption of Lake Superior ore increased to 6,634,243 tons in March from 6,440,586 tons in February making the first quarter total 20,131,496 tons compared with 20,267,344 tons in the like 1947 period. Total stocks declined 6,605,769 tons further to 16,022,253 tons as of Apr. 1 and compared with 17,411,010 tons a year previously. As of Apr. 1, 27 blast furnaces were idle in the United States against only 9 a month earlier while 155 were in blast against 173 as of Mar. 1. As of Apr. 1, 1947 167 furnaces were in blast and 16 were idle in the United States.

Manganese Ore. . .

New York — An $8 million manganese ore cargo aboard the sunken freighter SS Oregon, 17 miles northeast of Nantucket lightship, is the subject of salvaging efforts. To date two attempts have been made, and while unsuccessful, it is expected that the sunken treasure will yet be reclaimed.





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The free-machining characteristics of Holliday Speed Treat plate saved considerable time and money on this heavy machining job. Made by the Rheem Manufacturing Company, Stockton, Calif., this back-up plate for a boiler inspection press was machined from 3½" Speed Treat plate. Work included step machining, drilling of eighty-eight 25/32" holes . . . and the drilling and tapping of sixteen ⅝" holes. When you have a similar job . . . savings of better than 35% in machining costs can be effected through the use of Holliday Speed Treat (.45% carbon) or Speed Case (.20% carbon) Steel Plate.

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Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 147

Pittsburgh — Order backlogs for bolts and nuts have been further extended in recent weeks, reflecting continued heavy demand and slight reduction in operations. Full impact of disruption in mill receipts due to the coal strike is expected over the next four to six weeks. Some interests are promising six to eight months' delivery on bolts and nuts under 1/2-inch. Up to the present, most producers have been able to maintain near normal operating schedules at the expense of relatively small inventories. Output of fasteners remains restricted due to inadequate stocks of steel, notably cold heading, and the supply outlook over the coming months is not promising.

Chemicals Export Quotas Set for Second Quarter

WASHINGTON — Office of International Trade, Department of Commerce, has issued country export quotas of chrome and antimony chemicals for the second quarter. The total authorized allocations in pounds include: 1 million of antimony oxide, including 308,000 to undistributed reserve, and 692,000 to specified countries, including 250,000 to Netherlands, 150,000 to Belgium and Luxembourg, 100,000 to Belgian Congo; 30,000 of antimony sulfide, including 3000 to undistributed reserve and 27,000 to specified countries, including 13,900 to Brazil, 5900 to France; 400,000 of chromic acid, including 2500 for special projects, 20,000 to undistributed reserve, and 377,500 to specified countries, including 65,000 to France, 53,600 to Belgium and Luxemburg, 43,000 to Switzerland, 40,000 to Netherlands, 25,000 to Sweden; 1,100,000 of potassium bichromate and chromate, including 3200 to special projects, 101,600 to undistributed reserve, and 995,200 to specified countries, including 120,000 to Netherlands, 100,000 each to Mexico, Brazil, and Argentina; 3 million of sodium bichromate and chromate, including 250,000 for special projects, 300,000 to undistributed reserve, and 2,450,000 to specified countries, including 400,000 to Netherlands, 300,000 each to Mexico and Argentina, 250,000 to Brazil, 200,000 to Switzerland, 100,000 each to Chile, Belgium and Luxemburg, Turkey, China, and Egypt; 250,000 of chromium salts and compounds, including 26,800 for special projects and 223,200 to specified countries, including 30,000 to Italy, 20,000 each to Greece and France, 15,000 each to Turkey and China, 14,000 to Peru, 11,000 to Colombia, 10,200 to Mexico, 10,000 to Switzerland.

New Sheet Steel Producer To Begin Operations Soon

Pittsburgh—Steel Producers Inc., this city, a new producer of sheets, is expected to begin operations before May 15. This interest has leased space in the Toronto, O., plant of Follansbee Steel Corp. Equipment for the production of hot-rolled sheets is being installed and includes one 3-high and two 2-high mills. Monthly output is expected to range between 3000 and 5000 tons. Adequate tonnage of sheet bars, plate breakdowns and sheared hot bands has been obtained to initiate production schedules, but additional tonnage arrangements for these items will have to be made to sustain production through remainder of this year.

Rails, Cars . . .

Track Material Prices, Page 147

Birmingham — Pullman-Standard Car Mfg. Co. announces opening of a third assembly line at Bessemer, Ala., for production of the new P-S-1 composite type freight cars.

Canada . . .

Toronto, Ont.—Production of iron and steel in Canada is holding close to its peak level insofar as raw material supply is concerned. For the month of February, steel production maintained an average rate of 85 per cent, against 85.2 per cent for January. Output of steel ingots and castings for the month under review amounted to 239,646 net tons, and included 230,183 tons of steel ingots and 9463 tons of castings. Charges to steel furnaces in the month included 121,865 tons of pig iron; 76,704 tons of scrap of consumers' own make and 65,764 tons of purchased scrap.

Pig iron output in February totaled 151,123 net tons, for an average rate of 69.3 per cent, compared with 68.6 per cent for January. Production included 123,324 tons of basic iron of which 118,435 tons were for further use of producers and 4889 tons for sale; 15,117 tons of foundry iron with 2080 tons for further use and 13,037 tons for sale; 12,682 tons of malleable iron all for sale. During February blast furnace charges included 289,351 tons of iron ore; 12,765 tons of mill sinder, scale, sinter, etc., and 4494 tons of scrap.

Folowing are comparative production figures in net tons:

	Steel Ingots Castings	Pig Iron	Ferroalloys
Feb., 1948.....	239,646	151,123	11,823
Jan., 1948.....	256,726	160,042	17,125
Feb., 1947.....	229,222	150,632	9,357
2 Mos., 1948...	496,372	311,165	28,948
2 Mos., 1947...	479,020	327,945	19,001
2 Mos., 1946...	478,516	286,856	21,750

Steelworkers Seeking Insurance Program

(*Continued from Page* 74)

try officials doubt that any social insurance program of the pretentiousness asked can be agreed upon during current negotiations.

Industry sources believe that considerably more time will be required to work out the details of such a broad program. They believe that the only action on the insurance program likely to come out of the current wage negotiations may be an agreement to negotiate on the social security plan. If such action were taken, the way would be opened to include

a social insurance program in the labor contract to be negotiated in April, 1949.

Result of Year's Study — United States Steel Corp. subsidiaries last year indicated a "willingness to participate in the establishment of a new plan involving life, accident, health, medical and hospital insurance, provided an agreement could be reached with the union on the elements of the plan and on the methods for its financing and administration."

Over the past year, both company management and the union have devoted considerable study to such proposals. The demands now being pressed by the steelworkers union are the result of its study. In making the study, the union was aided by several "experts" on social security programs hired for that purpose. Among these were Murray Latimer, who directed the study of guaranteed wages for the administration two years ago.

Would Cost $100 Million—The program asked by the union would cost the steel industry about $100 million annually, or about $180 per employee per year. Total hours worked by wage earners alone in the basic steel industry last year were 1,054,000,000. On the basis of the cost estimates submitted by the union, the indicated cost to the basic steel industry for coverage of wage earners only would be $95 million annually. Should the proposed benefits be granted to wage earners, similar benefits likely would be granted to salaried employees.

Whatever social security benefits are eventually granted by the basic steel companies will also be asked of the nonbasic companies.

Jack & Heintz Places New Emphasis on Sales

Emphasis has shifted from production to sale of its products at Jack & Heintz Precision Industries Inc., Cleveland, according to Byron C. Foy, chairman and president, in the company's annual report.

This situation is particularly true for the firm's motors, bearings and refrigeration condenser units. Demand for aviation products and magnetos is still brisk, said Mr. Foy, with an upswing especially evident for aviation items. In view of these factors, the company is engaged in an extensive product development program and expects to diversify its line.

Although manufacturing operations resulted in a loss last year of

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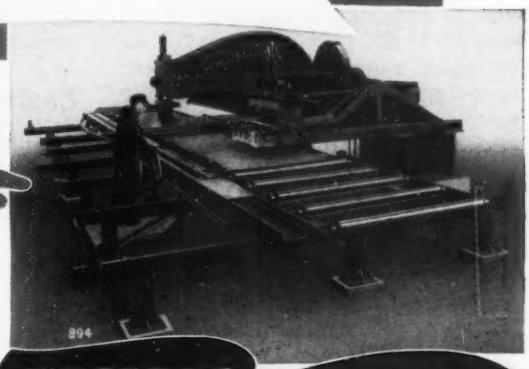

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$174,124, interest income and miscellaneous non-operating transactions enabled the realization of a net income of $174,623 for the year. Mr. Foy explained that 1947 operating costs were materially increased by expenditures for product engineering, production tooling, plant rearrangement and personnel training, all of which were charged to current operating expenses. Expenditures for machinery and equipment during the year totaled approximately $847,720. In its report for Mar. 6 to Dec. 31, 1946, Jack & Heintz disclosed a net operating loss of $3,049,427.

Canada Sees $2.8 Billion 1948 Capital Investment

Canadian private and public investment in new capital goods for 1948 is estimated at $2.8 billion, a 17 per cent increase over 1947 expenditures, according to reports presented to the Canadian House of Commons.

The program involves an anticipated expenditure of $1.6 billion on new construction and $1.2 billion on new machinery and equipment, representing increases of 21 and 12 per cent respectively over 1947 levels. Achievement of the plan is based on the assumption that production of pig iron, steel ingots and castings will be maintained at about or slightly above the 1947 rate in 1948, while the output of copper, asbestos, gypsum and coke should increase a small amount. Coal production is expected to be up more than 15 per cent.

Eastern Stainless Sets New Sheet, Plate Prices

Eastern Stainless Steel Corp., Baltimore, has announced the following changes in base prices of stainless steel sheets and plates, effective Apr. 23: Type 309, sheets 57½ cents a lb, plates 50 cents a lb; Type 310, sheets 67½ cents a lb, plates 60 cents a lb.

ERP Steel Needs in 1949 Set at 2.34 Million Tons

European Recovery Plan requirements of steel for export from the United States in the fiscal year 1949 were estimated last week by the House Committee on Foreign Aid at 2.34 million tons.

Among the committee's recommendations is one that requests for American steel scrap and pig iron be denied. The committee believes that the U. S. should not provide semifinished products, other than hot-rolled strip, to Western Europe at a rate exceeding 440,000 net tons a year. Furthermore, the utmost effort should be made, the committee says, to maximize the contribution of western Germany's steel industry.

Allegheny Ludlum Gets Navy-Owned German Mill

The Navy Bureau of Ordnance has placed a research and development contract with Allegheny Ludlum Steel Corp., Brackenridge, Pa., for the company to repair and install at its West Leechburg, Pa., plant a 50-ton Rohn cluster mill which the bureau obtained as reparations from Germany.

The mill, which has 20 rolls, had been operated at plant of Haraeus Vacuum Schmelze A. G. at Hannau, Germany, in producing thin strip. Allegheny Ludlum is to determine limits within which it can produce strip on this mill, which will remain in the bureau's possession.

A three-ton bench type Rohn mill which the bureau obtained from the Hannau plant is to be installed at the Naval Ordnance Laboratory at White Oak, Md., for research work.

Miners' Coal Strike Depletes Steel Stocks

(*Continued from Page 72*)

maintain operations by drawing on their meager inventories. However, mill shipments have lagged recently and inventories in the case of some metalworking shops have reached the vanishing point, with the likelihood that operations will decline before they improve. Most consumers look for increasing stringency in steel for some time to come. There is not only steel lost because of curtailed mill operations during the coal strike, but the likelihood of expanding demands for foreign aid and the defense program. This, of course, will actually better the position of some shops able to take such business, but the rank and file of metalworking shops will feel the squeeze for some time.

Further Reductions Expected

New York—In the New York metropolitan area, metalworking plants face a growing stringency in steel supply. With many unable to maintain anything like normal operations at best, indications are, in view of the loss of steel resulting from the

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recent coal strike, that they will be forced to make further reductions.

Scarcity is noted particularly in sheets, shapes and plates. Not only are mill deliveries badly snarled up as a result of recent disruptions, but grey market supplies are tighter, with prices in most cases fairly beyond all reason. Interestingly, many of the larger jobbers report more trouble these days supplying shapes than any other product, even including sheets.

Will Hit Last Half Output

Boston—With consumers' steel inventories already low and out of balance, the disruptions caused by the coal strike have added to the difficulties of metalworking companies. Executives of these firms believe the full impact of the coal suspension is yet to be felt. Outlook for third and fourth quarter quotas are clouded and second quarter quotas are being revised. Coal strike effects will show up more in last half operations than in current production.

Fabricators are low on plates and structurals. All flat-rolled steel, except stainless, continues in poor supply. Pipe is almost as bad.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2600 tons, department store, Jordan Marsh Co., Boston, to Lehigh Structural Steel Co., Allentown, Pa.; Thompson-Starrett Corp., general contractor.

661 tons, bridge, proj. 42-F, Rockford, Ill., for State Highway Department, to American Bridge Co., Pittsburgh.

500 tons, phosphorus plant, Pocotello, Idaho, through United Engineers & Constructors Inc., Philadelphia, to Herrick Iron Works, Oakland, Calif.

400 tons, addition, Gulf Refining Co., Philadelphia, to Bethlehem Steel Co.

375 tons, power house, state hospital, Norristown, Pa., to Bethlehem Steel Co.

350 tons, high school, Hinsdale, Ill., to Gage Structural Steel Co., Chicago, for fabrication by Allied Structural Steel Cos.

320 tons, Pennsylvania railroad bridge, Holmesville, Pa., to Fort Pitt Bridge Co. Pittsburgh.

204 tons, factory building, Herman Nemson Corp., Moline, Ill., to Rock Island Bridge & Iron Works, Rock Island, Ill.

158 tons, bridge SO98 (4) TO98(1), Buffalo county, Wisconsin, for state, to Bethlehem Steel Co.

100 tons, miscellaneous school buildings, to Isaacson Iron Works, Seattle.

100 tons, railroad car reconversion and ship repairs, to Puget Sound Bridge & Dredging Co., Seattle.

STRUCTURAL STEEL PENDING

9850 tons, traffic viaduct, Seattle, Wash.; bid call pending.

1800 tons, power house, Public Service Co. of Indiana, Noblesville, Ind.; bids Apr. 8.

1200 tons, plant addition, Pratt & Whitney Corp., Hartford, Conn.; bids in.

615 tons, bus structures, Grand Coulee east switchyard; bids to Bureau of Reclamation, Denver, Apr. 27.

400 tons, 250-foot two-span welded continuous girder bridge, Woodbridge, Co.; D. V. Fri-

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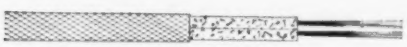

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250 tons, housing project, Worcester, Mass.

REINFORCING BARS . . .

REINFORCING BARS PLACED

800 tons, new building, Allstate Insurance Co., Chicago, to Truscon Steel Co., Youngstown, O.

420 tons, auxiliary outlet sewers, Beverly-Calumet system, cont. 1-A, Department of Public Works, Chicago, to Ceco Steel Products Corp., Cicero, Ill.; M. J. Boyle & Co., Chicago, contractor.

300 tons, Dorchester Arms apartment, Chicago, to Ceco Steel Products Corp., Cicero, Ill.

270 tons, power house, Northern States Power Co., Red Wing, Minn., to Paper Calmenson & Co., St. Paul; Pioneer Engineering & Service Co., Chicago, engineer.

200 tons, Anecortes school and state bridge, to Northwest Steel Rolling Mills, Seattle.

170 tons, addition, Silver Cross hospital, Joliet, Ill., to Carnegie-Illinois Steel Corp.; Hansen & Petersen Co., Joliet, Ill., contractor.

REINFORCING BARS PENDING

3250 tons, traffic viaduct, Seattle; bid call pending.

700 tons, addition to Seattle library; bids rejected; second call postponed.

500 tons, retail store, Sears, Roebuck & Co., South Bend, Ind.

488 tons, addition to buildings 3 and 4, State Hospital, Ana, Ill.; bids Apr. 15.

383 tons, extension to sludge disposal building, West-Southwest Sewage Treatment Works, Div. "Rb", Sanitary district of Chicago; Kenny-McHugh Co., Chicago, contractor; bids Apr. 1.

315 tons, Exhibition Park, Peoria, Ill., for city; V. Jobst & Sons, Peoria, Ill., contractor.

300 tons, addition to Port of Tacoma cold storage plant; general contract to Construction Engineers & Contractors, Tacoma, low $674,206.

149 tons, sanitarium, Hinsdale, Ill.

140 tons, University of Washington boiler plant; Strand & Co., Seattle, low $292,000 for general contract.

100 tons, research laboratory, Washington state hospital, Steilacoom; MacDonald Building Co., Tacoma, general contract, $351,948.

Unstated, $2 million Oregon state building; bids to Salem May 14.

Unstated, three steel and concrete state bridges Beaver Creek, Mussellshell river and Powell county; bids to Helena, Mont., Apr. 29.

Unstated, addition, McKinley high school, South Bend, Ind.; George Sollitt Construction Co., Chicago, contractor.

Unstated, building, American Medical Association, Chicago.

PIPE . . .

CAST IRON PIPE PENDING

2000 tons plus, 114,000 feet various sizes; bids to Spokane, Wash., Apr. 29.

PLATES . . .

PLATES PLACED

11,000 tons, 48-inch water line, Minneapolis, for city, to Bethlehem Steel Co.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chicago Great Western, two 6000-horsepower diesel-electric freight locomotives and three 1500-horsepower units, all for road service, and three 1000-horsepower switch engines, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Grand Trunk Western, eleven 3000-horsepower 2-unit diesel-electric locomotives, to the Electro-Motive Division, General Motors Corp., La Grange, Ill.

CONSTRUCTION AND ENTERPRISE

ALABAMA

BIRMINGHAM—J. D. Pittman Tractor Co. has received low bid of $201,500 from Brice Building Co. for alterations and additions to a building.

BIRMINGHAM—Texas Co. has awarded a $2,310,000 contract to Ingalls Shipbuilding Corp., Pascagoula, Miss., for a twin-screw oil tanker. Ship will be 400 ft long, with a 62½ foot beam and a depth of 21 ft.

DECATUR, ALA.—Automatic Screw Machine Products Co. plans to build a factory here.

ARKANSAS

JONESBORO, ARK.—Jonesboro Grease Extraction Co., Fred Rigdon, president, Kennett, Mo., will build a $50,000 feed and fertilizer plant near here.

RUSSELLVILLE, ARK.—Arkansas Power & Light Co. has awarded a joint contract to Fagan Electric Co., Little Rock, and Killoren Electric Co., Batesville, for a 110,000 volt transmission line from Morrilton to Russellville. Project is part of a $1 million program.

DELAWARE

WILMINGTON, DEL.—B. F. Shaw Co., Second and Lombard Sts., has awarded an $80,000 contract to Rust Engineering Co., Clark Bldg., Pittsburgh, for construction of an annealing furnace.

KANSAS

KANSAS CITY, KANS.—Marley Co., 3001 Fairfax Rd., has awarded a $250,000 contract to Dreir & Sons, 1123 Quinchao Blvd., for altering a factory into an office building.

KENTUCKY

LOUISVILLE, KY.—Louisville Gas & Electric Co. plans a $20 million improvement and expansion program to include two 60,000 kw turbo-generator units at Paddy's Run power plant.

MAINE

PORTLAND, ME.—Socony-Vacuum Oil Co. Inc., New York, plans construction of a plant here for handling cylinders of liquefied petroleum gas.

MARYLAND

BALTIMORE—Consolidated Gas, Electric Light & Power Co., Lexington Bldg., has awarded a $1 million contract to Arundel Corp., Pratt St., for a power plant at 2101 Kloman St.

BALTIMORE—American Smelting & Refining Co. is preparing to install a furnace using electric power instead of oil.

MASSACHUSETTS

ATTLEBORO, MASS. — Robbins Co., c/o Robert Schultice, Maple St., has awarded a $100,000 contract to Morton C. Tuttle Co., 862 Park Sq. Bldg., Boston, for construction of a factory.

NEW BEDFORD, MASS. — Acushnet Process Co., 744 Belleville Ave., has awarded a $68,000 contract to Olson & Appleby, 227 Union St., for a rubber goods plant addition.

NEW YORK

NEW YORK—Western Electric Co., 195 Broadway, has purchased a site equal to four city blocks at Varick, Hudson and Laight Sts. in lower Manhattan for future construction of a headquarters building.

NEW YORK—Worbes Corp., 643 Southern Blvd., will build a $193,000 factory on 135th St. near Willow Ave.

TOMPKINS COVE, N. Y.—Rockland Power & Light Co., 12 N. Broadway, Nyack, has

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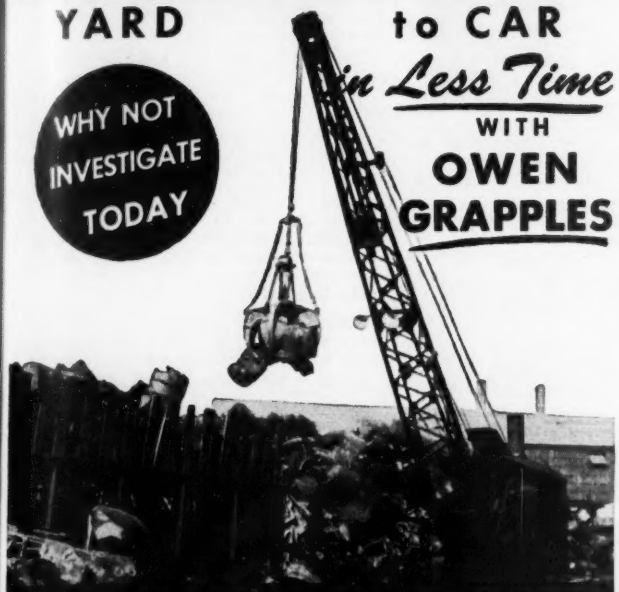

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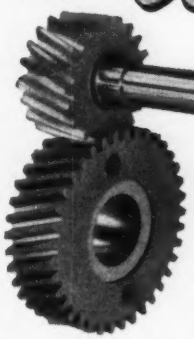

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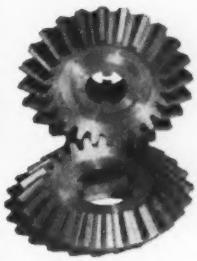
SPUR GEARS—Size range from ¾" to 150" in diameter. 32 DP to ¾ DP.
HERRINGBONE GEARS—Made from 1" to 60" in diameter and from 10 DP to 1½ DP.
SPIRAL BEVEL GEARS—Made from 1" to 30" in diam. and 24 DP to 1½ DP.
WORM GEARS — Made from 1" to 100" in diam. and from 24 DP to 1 DP.



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awarded a $300,000 contract to Deakman-Wells Co. Inc., 921 Bergen Ave., Jersey City, N. J., for the superstructure for a generating plant.

OKLAHOMA

MUSKOGEE, OKLA.—Consumers Co-operative Association, Kansas City, Mo., plans a $200,000 fertilizer plant here or at some other eastern Oklahoma point.

RHODE ISLAND

CRANSTON, R. I.—T. A. Monahan, Wellington Ave., has awarded a $125,000 contract to Westcott Construction Co., 42 Weybosset St., Providence, for erection of a factory.

TENNESSEE

CHATTANOOGA, TENN.—Tennessee Products & Chemical Corp., Carl McFarlin, Nashville, president, has in progress a $1 million expansion program which includes two plants, one to increase production of ferrosilicon and the other fine chemicals.

KINGSPORT, TENN.—Mead Corp., c/o contractor, has awarded a $100,000 contract to Austin Co., 16112 Euclid Ave., Cleveland, for construction of a plant.

TEXAS

CORPUS CHRISTI, TEX.—Central Power & Light Co. has awarded a $115,000 contract to Lee Aiken for the sub-structure for a power plant.

HOUSTON, TEX. — Mosher Steel Co., 2910 Washington St., has awarded a $190,000 contract to O'Rourke Construction Co., 4011 Koehler St., for two buildings.

HOUSTON, TEX.—Shell Oil Co., Shell Bldg., has awarded a $648,000 contract to Harold Van Buskirk & Co., S. Standard Bldg., for construction of a chemical plant addition.

OVERTON, TEX.—Humble Oil & Refining Co., 1216 Main St., Houston, has awarded a $1,250,000 contract to Fish Engineering Corp., M & M Bldg., Houston, for construction of a gasoline plant expansion.

PT. ARTHUR, TEX.—Texas Co. has awarded a $2,350,000 contract to Foster Wheeler Corp., Shell Bldg., Houston, for expansion of lubricating oil and wax manufacturing facilities at its refinery here.

PT. LAVACA, TEX.—Aluminum Co. of America, Pittsburgh, has taken an option on a 3000-acre tract on the east side of the causeway here for a plant.

WACO, TEX.—General Tire & Rubber Co., 1708 E. Market St., Akron, plans a $200,000 project to expand its plant here by 25 per cent.

WACO, TEX.—Texas Power & Light Co., c/o John C. Young, will build a $750,000 electric booster or sub-station plant.

WESLACO, TEX.—Holt Equipment Co. has awarded a $70,000 contract to A. W. Voekel, for a storage and service facility.

UTAH

SALT LAKE CITY, UTAH — Intermountain Tractor Sales Corp., 715 W. Second St., has awarded a $93,000 contract to Ballard & Flandro, 1215 S. 13th St., for construction of a tractor assembly plant.

VIRGINIA

GLASGOW, VA.—James Lee & Sons, Bridgeport, Pa., has awarded a $750,000 contract to Wise Contracting Co., Eighth and Grace Sts., Richmond, for a plant expansion.

WASHINGTON

GRAND COULEE, WASH.—Bureau of Reclamation has awarded Westinghouse Electric Corp. the contract for three additional 108,000-kw generators for Grand Coulee Dam.

SPOKANE, WASH.—Columbia Gypsum Products Co. will build a $670,000 plant here to process Canadian raw material from recently acquired property near Lake Windermere, B. C., said to contain 40 million tons of raw gypsum.

TACOMA, WASH.—American Smelting & Refining Co., 120 Broadway, New York, has awarded a $230,000 contract to Western Knapp Engineering Co., 760 Folson St., San Francisco, for construction of an ore unloading and storage plant.

YAKIMA, WASH.—Food Machinery Corp., 217 W. Julian St., San Jose, Calif., has awarded an $88,987 contract to Riggle & Creighton for construction of a building.

CANADA

HAMILTON, ONT.—John Deere Plow Co., Ltd., 110 Princess St., Winnipeg, Man., plans a $250,000 warehouse and distribution center.

PT. STANLEY, ONT.—Dominion Natural Gas Co., Jackson Bldg., Buffalo, has awarded a $1 million contract to Johnson Bros. Co. Ltd., 37 Market St., Brantford, for an oil-gas plant.

AMHERST, N. S.—Canada Electric Co., 56 Church St., Toronto, has awarded a $1,500,000 contract to Robb Engineering Works Ltd., 51 La. Planche St., for a power plant.

PRICES OF LEADING FERROALLOYS PRODUCTS

(Concluded from Page 149)

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l. bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c, c.l. packed 6.05c, ton lot 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l. and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), **$3. High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.40c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone contract, 100 lb or more. 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western add 2.9c, freight allowed. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed, Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: (17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.